

Study on a
Methodology for
Identifying Sectors
with Serious
Structural
Problems

Report
To

European
Commission
Competition DG

by
London Economics

December 2002

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Executive Summary

On 13 February 2002 the European Commission approved a new Multisectoral Framework on regional aid for large investment projects.¹ This new Framework aims to simplify and streamline the process put in place under the previous multisectoral framework that became effective on 1st of September 1998 for an initial trial period of three years and was subsequently extended to 31 December 2002.

The new framework provides stricter rules for sectors suffering from structural problems in order to prevent serious distortions of competition. These sectors will be specified in a "List of sectors" annexed to the Framework and, in principle, no regional aid to investment projects above a certain threshold of eligible expenditure will be authorised in these sectors². However, an exception to this rigorous approach will be made if the Member State granting regional aid can demonstrate that, although the sector is deemed to be in decline, the market for the product concerned is fast growing.

London Economics has been commissioned by DG Competition state aid II to develop a general methodology that could be used by EC officials to draw up an initial "List of sectors" where serious structural problems prevail.

In this report we present an overview of the economic literature on declining industries or industries with structural problems, set out an analytical framework that reviews the typical behaviour of various aspects (sales, output, employment) of an industry when the industry is in decline or faces deep structural problems, present the results of our investigation of the availability of relevant data at the EU or EEA level, and review a methodology for establishing a "List of sectors" that we judge to be robust and feasible on the basis of our findings on the availability of data.

The literature review shows that simple definitions of declining industries tend to focus on trends in output or production while studies focusing on the

¹ Commission of the European Communities, Communications From The Commission, Multisectoral Framework on regional aid for large investment projects, Brussels, C(2002) 315 final.

² The Commission's communication specifically notes that regional aid to the steel industry is not compatible with the common market and therefore, as under the specific framework currently applying to the steel industry, it should remain prohibited. Therefore, the steel sector should definitely be included in the "List of sectors".

multidimensional aspect of industrial decline consider a much richer set of different economic variables.

Both approaches tend to focus on absolute and persistent declines in industry performance indicators such as output, sales, etc.

The economic indicators used in multivariate studies of industries in decline can be grouped into four broad categories: industry population dynamics, production, domestic market and external market.

1. Industry population dynamics: firm entry and exit, merger activity and effects on mergers on capacity;
2. Production variables: production capacity, output, value added, shipments, capacity utilization rate, total sales (or turnover) and employment;
3. Domestic market: total domestic use or apparent consumption, domestic market share of imports;
4. External market: level of exports, world market share.

Our analytical review of the pattern that a number of economic indicators are likely to exhibit in declining industries shows that a number of indicators could be used while minimizing the risks of committing the error of including on the "List of sectors" industries/products that are not in decline. Such indicators are apparent consumption in value, and production in value and volume.

Prices, employment, capacity and investment and the number of firms in an industry, when used on a stand-alone basis, are less robust indicators. However, they could be used in conjunction with a production indicator and, if all indicators were to move in the same direction, this would be a strong indication that the sector is really in decline.

We review of various Eurostat dataset, the only consistent pan-European data sources of industrial activity at a detailed level, namely 1) the European System of Accounts (based on national accounts data), ESA 1995, Table 3: Tables by industry – annual exercise; 2) the Structural Business Statistics; 3) the products database Prodcom; and 4) the Short-Term Statistics of industrial activity.

Following a careful review of the pros and cons of each data source, we have concluded that the fourth data set, i.e. the Short-Term Statistics are the most useful and recommend their adoption for the purpose of applying the proposed methodology for identifying sectors in decline.

Next, we set out the key elements of our recommended methodology for establishing the List of sectors and develop two illustrative Lists of sectors.

In short, our proposed approach defines sectors in decline as those industries that meet the following three conditions:

1. The industry shows an absolute decrease in production in volume over the reference period.
2. The industry shows an increase in production in value that is lower than the general price increase over the reference period.
3. The industry shows a steady pattern of decline of production in volume as evidenced by the fact that output in volume declined at least during 2 years. This additional condition ensures that output in volume is really in trend decline in the industry and that the overall decline over the reference period does not simply capture one sharp drop in a given year.

In addition, we recommend applying a further filter based on the capital intensity of the industries.

We recommend to use the industry production data and domestic producer price data from the Short-Term Statistics databank in the application of the proposed methodology and to perform the analysis at the Nace Rev.1 4-digit manufacturing classification level. However, because in some instances Nace does provide information at a 4-digit level of disaggregation, we recommend undertaking the analysis in those instances at a 3-digit, or even a two 2-digit level.

1 Introduction

London Economics are pleased to present to the European Commission the Final Report of the project "Study on a Methodology for Identifying Sectors with Serious Structural Problems".

The background to the study was set out in the terms of references defined by DG Competition DG State aid II in the invitation to tender COMP/H/2002/03 "Invitation to tender for a study on a methodology for identifying sectors with serious structural problems". The terms of reference were further clarified in the project launch meeting with officials from DG Competition DG State aid that took place on July 15, 2002.

1.1 Background

On 13 February 2002 the European Commission approved a new Multisectoral Framework on regional aid for large investment projects.³ This new Framework aims to simplify and streamline the process put in place under the previous multisectoral framework that became effective on the 1st of September 1998 for an initial trial period of three years and was subsequently extended to 31 December 2002. The overall objective of the multisectoral framework on regional aid for large investment projects is to prevent "regional aid" shopping by large investment projects and to cap the level of regional aid available for large projects to a level that avoids as much as possible distortions of competition.

Distortion of competition is most likely to occur in sectors suffering from structural problems, where the existing production capacity already exceeds the market demand for the product, or where the demand for the product concerned is persistently declining. The provision of regional assistance to large investment projects in sectors that either are or will be facing serious overcapacity or persistent decline in demand increases the risk of distortion of competition, without bringing the necessary counterbalancing benefits to the region concerned. Therefore, in such cases, regional aid should either be reduced or completely prohibited.

Besides being simpler and more transparent than the current framework, the new framework aims to:

1. Tighten up the rules for regional aid granted to large-scale projects while maintaining a proper balance between the Community's three

³ Commission of the European Communities, Communications From The Commission, Multisectoral Framework on regional aid for large investment projects, Brussels, C(2002) 315 final.

core policies of undistorted competition in the internal market, economic and social cohesion, and industrial competitiveness;

2. Incorporate several frameworks into a unified instrument. More precisely, the so-called “sensitive sectors” (motor vehicles, steel, and synthetic fibres) that were subject to sector-specific frameworks and remained outside the ambit of the current framework will be subject to the new framework’s rules;
3. Reduce the administrative burden and increase predictability;
4. Provide for stricter rules for sectors suffering from structural problems in order to prevent serious distortions of competition. These sectors will be specified in a “List of sectors” annexed to the Framework and, in principle, no regional aid to investment projects above a certain threshold of eligible expenditure will be authorised in these sectors⁴. However, an exception to this rigorous approach will be made if the Member State granting regional aid can demonstrate that, although the sector is deemed to be in decline, the market for the product concerned is fast growing.

It is this latter point 4 that is the core subject of the study commissioned by the DG Competition state aid II.

1.2 Terms Of Reference of the Study

1.2.1 The terms of reference set out in the tender document

As stated in the tender document, the purpose of the study is to “establish the general methodology and its justification, that allows to draw up an initial List of sectors where serious structural problems prevail. The study will be the basis for the proposal that the Commission will send to Member States. Strengths and weaknesses of the methodology should be discussed”.

Moreover, in doing so, the study needs to take account of the fact that, in its Communication, the Commission stated that:

1. In principle, serious structural problems will be measured on the basis of apparent consumption data (from the Prodcom databank), at the appropriate level of CPA classification in the EEA, or, if such information is not available, on the basis of any other market

⁴ The Commission’s communication specifically notes that regional aid to the steel industry is not compatible with the common market and therefore, as under the specific framework currently applying to the steel industry, it will remain prohibited.

segmentation generally accepted for the products concerned and for which statistical data are readily available;

2. Serious structural problems will be deemed to exist when the sector is declining, with a strong presumption of sectoral decline if a negative average annual growth rate of apparent consumption is observed in the EEA over the last five years;
3. The market for a given product will be deemed to be fast growing if apparent consumption over the last five years at the appropriate level of Prodcom classification in the EEA, or if such information is not available, on the basis of another market segmentation generally accepted for the products concerned and for which statistical information is readily available, is growing in value terms by an average rate equal to or above the average growth rate of the EEA's GDP.

In short, the Commission's Communication reveals a clear preference for using, whenever possible, data from the Prodcom database. Moreover, as illustrated below, it implicitly defines three possible product market situations with each being given a clear status in the context of the new framework.

Table 1-1: Definition Of Sector and Product Situation In New Multisectoral Framework and Admissibility of Regional Aid to Large Investment Projects			
State of Sector	Sector is declining	Sector is growing, but at rate lower than EEA-wide GDP	Sector is growing at the same rate or faster than EEA-wide GDP
Assessment of the sector	Strong presumption of sector with structural problems. Sector to be included on the list of ineligible sectors	No presumption of structural problem. A sector whose output grows at a rate lower than EEA-wide GDP will <u>not</u> be included on the list of ineligible sectors.	Fast growing sector.
Admissibility of regional aid for large investment projects	<u>No</u> regional aid to specific product permissible unless growth rate of demand for product is higher than EEA-wide GDP growth.	Regional aid to specific product is permissible provided regional aid criteria are met	Regional aid to specific product is permissible provided regional aid criteria are met

1.2.2 Issues raised during the project launch meeting

During the project launch meeting, Commission officials also noted that they wished the study to address the following issues:

1. Should the analysis be done in value or volume terms?
2. At what level of industry/product aggregation should the “List of sectors” be established?
3. What are the relative merits of an apparent consumption⁵ indicator versus a capacity utilisation indicator in establishing the “List of sensitive sectors”?
4. At what threshold of eligible investment expenditures should regional aid be prohibited for investment projects in industries with structural problems?
5. How should the issue of niche markets be addressed?
6. How often should the “List of sectors” be updated?

1.3 Structure Of Final Report

The Final Report is structured as follows: in Section 2, we present a brief overview of the economic literature on declining industries or industries with structural problems; in Section 3 we set out an analytical framework that reviews the typical behaviour of various aspects (sales, output, employment) of an industry that is in decline or faces deep structural problems; in Section 4 we present the results of our investigation of the availability of relevant data at the EU or EEA level and review in greater detail the Eurostat data set that would be the most useful for establishing the list. In Section 5, we present the results of our surveys of national statistical agencies and business associations. Our proposed methodology is set out in Section 6 and Section 7 provides the conclusions to the report. Annexes 1 to 5 provide more detailed information on some of data sources that are reviewed in Sections 4 and 5.

⁵ Apparent consumption or total domestic use is generally defined as follows: apparent consumption = domestic production + imports - exports

1.4 Acknowledgements

We would like to express our special thanks to the Eurostat officials for their assistance and advice on the various Eurostat databanks. In particular, we would like to thank Mr. Barbe , Mr. Barchellan, Mr. DeGeuser, Mrs. Feldbaek, Mr. Feuvrier , Mr. Linard, Mr. Newson, Dr. Schäfer and Mr. Williams for their valuable insights and guidance.

We would also like to thank all the officials from the national statistical agencies and pan-European business organisations who took the time to respond to our queries and survey.

2 Review of the Literature

2.1 Introduction

The concepts of “Industries in decline” or “Industries with structural problems” are often used by the press and policy-makers. Yet there are precious few examples of serious scientific studies of the precise characteristics of such an industry. Similarly, a number of academic studies⁶ have focused on the strategic behaviour of firms in declining industries such as the sequencing of exit among various types of firms in the industry (large, small, diversified, etc.), the use of mergers to address the issue of restructuring and capacity reduction, and the potential need for public assistance for such mergers. Other studies have focused on the relationship between declining industries and lobbying for trade protection.⁷ Yet, there exist few studies that examine in great detail the fundamental characteristics of a declining industry.

That being said, a conclusion from the theoretical literature is that declining industries are likely to be characterised by significant merger activity whose expressed purpose is to restructure the industry and reduce existing capacity.⁸ However, this does not imply that one could infer that an industry is in structural decline if one observes significant merger activity in that industry. In fact, many mergers occur in growing markets and may be more related to other factors such as stock market valuations of equity of merging parties, expected economies of scale and scope, general market-positioning strategy, etc.^{9 10}

⁶ See for example Baden-Fuller (1989), Dutz (1989), Ghemawat and Nalebuff (1990), Hillman (1982), King (1998), Lieberman (1990), Maloney and McCormick (1988), McMillan (1994) and Terasawa and Gates (1994 a and b).

⁷ Brainard and Verdier (1994, 1997).

⁸ In other words, from an empirical point of view, one should be able to observe significant capacity reduction announcements by firms that have merged in declining industries (see Cardoso Marques 1999). Such mergers may take various forms, ranging from the sale of its plants to one of its competitors by a firm exiting fully the industry to two firms merging to form a new and larger, more cost-effective, entity in the sector. More generally, some capacity streamlining or reduction may also occur following mergers in growing industries. But, in growing industries one would expect this capacity-cutting process to be only a temporary phenomenon and overall capacity to expand again over the medium term. In contrast, capacity reductions are likely to be of more permanent nature in declining industries.

⁹ For a summary overview of key factors driving mergers see Ali-Yrkkö (2002) and Meshi (1997).

¹⁰ A recent paper by Jovanic and Rousseau (2001) makes the point that mergers are a more efficient tool for recycling industry assets than exit and entry.

Our multilingual search¹¹ for relevant economic literature and business press has yielded many press articles on declining industries or industries with structural problems in which simple indicators such as trend declines in sales, output or employment or persistent excess capacity are used to define such industries.

But, the academic literature on this issue is much more limited. Below we present a brief overview of some of the most relevant articles. It should be noted at the outset that most of the academic literature relates to either the Japanese, or U.K. or North American experience.

We start our review of the literature with examples of simple definitions of declining industries¹² and then present some of the more complex characterisation of such industries.

2.2 Simple Definitions Of Declining Industries

2.2.1 Output and capacity

A typical example of a simple definition of a declining industry is the study by Gera and Mang (1997) that examines the link between industrial structural change and the growth of the knowledge economy. More precisely, the authors study the changes in the relative weight of various industries, including services industries, in the Canadian economy over the period 1971 to 1991 and over three sub-periods (1971 to 1981, 1981 to 1986 and 1986 to 1991). They define a declining industry as an industry whose real output¹³ growth is below the Canadian economy's average growth of real output for at least two of the three sub-periods.

¹¹ We have conducted extensive searches of the English, French, German, Greek, Italian, Spanish, and Portuguese literature on this issue.

¹² For simplicity, we will use the concept of declining industries to refer to industries in decline and industries suffering from chronic excess capacity. In reality, the two situations are not necessarily identical as an industry in decline may not suffer from chronic excess capacity if capacity is adjusted steadily in line with declining demand. Similarly, an industry with chronic excess capacity does not necessarily imply an industry in decline. For example, it may face a growing demand but perhaps at a less rapid rate than anticipated when the capacity was put in place or the excess capacity was put in place as strategic entry deterrence and/or it may be a disciplining tool in an oligopolistic market structure.

¹³ In this study, the authors use industry Gross Domestic Product (value added) as a measure of industrial output.

In other words, the authors define a declining industry in relative terms -- it is an industry that systematically performs less well than the economy as a whole. In their report, they further distinguish between industries posting absolute declines in output and industries whose output grows but at a much slower rate than the economy.

A different approach is taken by Filson and Songsamphant (2001) who study horizontal mergers and exit in declining U.S. manufacturing industries (at the 4-digit SIC level) over the period 1975 to 1995. Using a simple duopolistic model of exit, the authors show that under certain conditions¹⁴ a declining industry will be most likely to experience horizontal mergers since they are both privately and socially desirable.

They define a declining industry as an industry in which output¹⁵ begins to decline in the 1975-1985 period, declines over at least five years, and then remains below the pre-decline output level until at least 1995. The authors note that they have adopted such a definition to eliminate industries whose decline is only due to cyclical fluctuations.

Thus, in contrast to the previous study, Filson and Songsamphant adopt an absolute measure of a declining industry, namely that the industry has to post five consecutive years of output decreases and that, over the period of the study, the industry's output never rebounds thereafter to its pre-decline level.

The Lieberman (1990) study of the US chemicals industry also uses an absolute measure of decline in output and capacity. Chronic decline is defined as the difference between the level of output (capacity) in 1987 and the previous peak year of output or capacity, whichever occurred earlier. The peak years for the 30 chemical products studied by Lieberman are usually in the late sixties or early seventies. A similar approach is also taken by O'Connor (1993) who highlights the absolute decline in output over the period of 1980 to 1985 in a study of the decline of the Malaysian textile industry.

2.2.2 Demand

Instead of focusing on output, Baden-Fuller (1989), in his study of the U.K. steel castings industry, highlights the sharp and persistent decline in new orders. Other studies focus on absolute declines in demand. An example of such an approach is the study by Alexander (1994) that examines how

¹⁴ The conditions are that (1) the market is highly concentrated, (2) the inverse demand curve is steep when output is high and shallow when output is low, and (3) the industry declines slowly initially and more rapidly in later stages.

¹⁵ Industry output is defined as the value of shipments in each industry divided by the industry selling price index.

external forces coupled with secularly falling domestic demand led to the decline of the US machine tool industry.

Others such as the Regional Association of the Chambers of Commerce of Emilia-Romagna identify industries in decline as those industries posting export growth that is below average growth in world demand and overall exports (UnionCamere Emilia-Romagna, 1999). The study also constructs an indicator of performance base on the ratio between growth of world demand and growth of exports. When this indicator takes a value greater than 1 the sector is said to be not performing well, while a value smaller than 1 indicates that the sector is doing well as compared to the world market.

Similar, single-variable definitions of industrial decline are also used by a number of industry associations or federations in their discussion of the state of their sector. Generally, an absolute measure of industry decline is used.

2.2.3 Employment

Some studies use declining employment as an indicator for declining industries (such as Baba Navaretti, 2000 who focuses on the Italian textile sector). This is also the case of a number of public sector bodies such as various States in the United States that focus on the evolution of employment as an indicator of industrial decline.

For example, the State of Rhode Island, in its labour and employment projections, defines an industry in decline as an industry with a minimum employment level of 100 that is expected to show negative job growth resulting in the loss of fifty jobs or more over the 1998-2008 projection period. The State of Wyoming has adopted an even more stringent and short-term definition. It defines an industry in decline as an industry whose employment level is decreasing for two quarters by more than 5 per cent.

In this regard it is interesting to note that the world steel organization, on its web page¹⁶, stresses that employment is not used as a measure of industry development as it may be reflecting improved productivity to some degree.

2.2.4 Innovation

A number of studies have examined the relationship between innovation and the lifecycle of an industry (see below for discussion of the life cycle approach in general). The main findings are that innovation tends to decrease as industries mature and decline (Abernathy and Utterback, 1978 and Foster, 1986). But, these findings have recently been questioned by McGahan and

¹⁶ www.worldsteel.org/wsifhelp.php

Silverman (2000) who find no relationship between the level of patenting activity and the life-cycle stage of the industry.

2.3 Multivariate Definitions Of Declining Industries

Following this brief overview of single-variable approaches to the definition of a declining industry, we will now review some of the literature using a richer multivariate framework. We will start our review of this strand of the literature by focusing on Japan's approach to declining industries.

Since the late seventies, Japan has actively promoted the restructuring of depressed industries. Of key interest for the purpose of establishing a "List of industries" are the criteria used in Japanese policies, legislation and regulations to define declining industries that would be eligible for public assistance.

According to Peck et al. (1988) and Sekiguchi (1994), the Japanese 1978 law providing the framework for public assistance to depressed industries defined a depressed industry as follows:

1. Most firms in the industry must be confronted with 'extremely unstable economic conditions' that are expected to prevail for a long time;
2. The industry's difficulties must have been caused by a drastic change in domestic or international economic conditions;
3. There must be considerable excess capacity in the industry;
4. A reduction in capacity must be both necessary and likely to take a long time without assistance.

Moreover, according to Sekiguchi (1994), the key economic variables that were used for assessing an industry's actual performance were production, the operating ratio (or capacity utilization rate), the import ratio and employment. Sekiguchi also notes that, after 1983, the key focus shifted to current profits, prices, production, imports, exports, the operating ratio and the need for capacity reduction.

Examples of U.S. and U.K. studies that focus on the many dimensions of declining industries include the study by Amin and Smith (1990) that examines the developments in the U.K. motor vehicle components industry, the study by Corcoran (1990) on the U.S. machine tool industry, the study by Tan and Lewis (1994) that focuses on the machine tools, hydraulic cement and industrial fasteners industries in the U.S and the work by Walsh (1991) on the U.K. textile industry.

-
- In the Amin and Smith study, the decline of the U.K. motor vehicle components industry is studied over the period 1979-1986. Declines in output and employment as well as increases in the share of the domestic market accounted for by imports are the main variables used to document the structural contraction of the domestic industry. Developments in labour productivity and profitability are also closely examined. The specific economic variables used in the study are: employment, gross output in real terms, sales in real terms, the market share held by imports, exports in value and volume terms, labour productivity and a proxy measure of profitability (i.e., the value of gross output less wages, capital expenditures and the cost of materials, parts, industrial and non-industrial services, bank charges, advertising, rates etc.).
 - Corcoran, in his study of the structural decline of the U.S. machine tool industry uses the following indicators to define declining industries: a comparison of the growth in industry shipments with the growth in total manufacturing shipments and economy-wide growth, trend growth between peak years of shipments (this is a rough measure of potential output), employment, the domestic market share held by imports, the domestic industry's market share in export markets and productivity.
 - + It is useful to note that the author notes that "A growing industry expands its capital equipment, embodying the latest technological change and providing opportunities to gain experience, both of these translate into increased productivity. These are absent in a declining industry".
 - Tan and Lewis study the adjustment responses of declining U.S. industries over 4 five-year periods (1963-67, 1967-72, 1972-77 and 1977-82). They focus on industry entry and exit, and the petitioning for import relief in three industries in particular, namely the machine tools, hydraulic cement and industrial fasteners industries. Instead of studying overall industry output and employment decline, they examine actual entry and exit by firms over a five-year period. The two authors analyse changes in the number of plants, value of shipments and employment caused by entry and exit in a declining industry because, in their view, industry level data conceal rich dynamics caused by firm entry and exit, and industry level data underestimate job losses arising from plant downsizing/closure in declining industries.
 - Walsh, in her study of the U.K. textile industry over the period 1973 to 1982, focuses on trend growth in output and employment and the gap between actual production and the previous output and employment peak. In particular, she notes that despite output growth in the eighties, industry output in 1987 was still well below its pre-1979 recession level.
-

2.4 Life-Cycle Approach

A number of authors do not focus on declining industries per se but rather aim to understand the demographic dynamics (entry, exit, etc) of industries, and the determinants of their market structure, and the ultimate number and size distribution of firms in an industry. The broad consensus of this type of literature is that the number of firms stabilizes in the mature stage of an industry after having fallen often sharply during a preceding consolidation phase. In the declining stage, the number of firms is expected to decline and entry to be close to zero (see, for example, Cantner and Hanusch, 1998, Cruz, Arranz and Escudero, 2002, Janovic and MacDonald, 1994, Klepper and Grady, 1990, Le Dortz, 1995, Malerba and Orsenigo, 1996). Generally, however this literature does not examine in detail the declining or end phase of an industry, but rather focuses on the birth-to-maturity cycle.

2.5 Concluding Remarks

Simple, single variable, definitions of declining industries tend to focus on trends in output or production while studies focusing on the multidimensional aspect of industrial decline consider a much richer set of economic variables.

Both approaches tend to focus on absolute and persistent declines in industry performance indicators such as output, sales, etc.

The economic indicators used in multivariate studies of industries in decline can be grouped into four broad categories: industry population dynamics, production, domestic market and external market.

1. Industry population dynamics: firm entry and exit, merger activity and effects of mergers on capacity;
2. Production variables: production capacity, output, value added, shipments, capacity utilization rate, total sales (or turnover) and employment;
3. Domestic market: total domestic use or apparent consumption, domestic market share of imports;
4. External market: level of exports, world market share.

It is important to note that, in all these studies, under-utilised capacity or excess capacity is the direct result of a decline in demand. Excess capacity may exist for a number of reasons¹⁷, such as entry deterrence, lumpiness of investment projects combined with pro-cyclical industry investment behaviour, or optimal buffer for responding to unexpected demand surges.

¹⁷ See for example Fagnart and al. (1997), Gabszewicz and Poddar (1997), Jendges (1994), and Sheshinski and Dreze (1976).

Obviously, if excess capacity existed only for these reasons, an industry could hardly be said to be in decline. Therefore, before concluding that an industry is in decline, the information provided by any capacity utilisation indicator would need to be corroborated by economic indicators.

In the next section we will present an analytical framework that can be used to examine, from a theoretical point of view, the range of likely observable patterns of co-movements in the main economic variables listed above, for an industry in decline.

3 Characteristics of Sectors in Structural Decline

In this section we discuss possible interpretations of “structural decline” and investigate observable characteristics associated with these interpretations.

From the point of view of a firm operating in the European Economic Area (EEA), a structural decline can have two different interpretations:

- The decline may be due to an increase in the competitive advantage enjoyed by producers from outside the EEA; or,
- The decline may be caused by declining demand in the EEA and/or abroad.

The two situations may occur in conjunction or separately.

Either way, they signify a structural problem for the EEA producers in this industry. Therefore, our aim is not to distinguish between the two types of decline but rather consider the observable price and volume characteristics that are common to both.

We will start our analysis by reviewing the domestic consumption and output patterns in the case of a persistent loss of domestic competitiveness. We then examine the consumption and output patterns in the case resulting from a persistent decline in demand.¹⁸ We then address the issue of whether, in the two cases, it is preferable to focus on the economic aggregates in value or in volume.

We complete this analytical overview with a short discussion of the implications of the industry life-cycle model and then address the issue of the proper product/market definition.

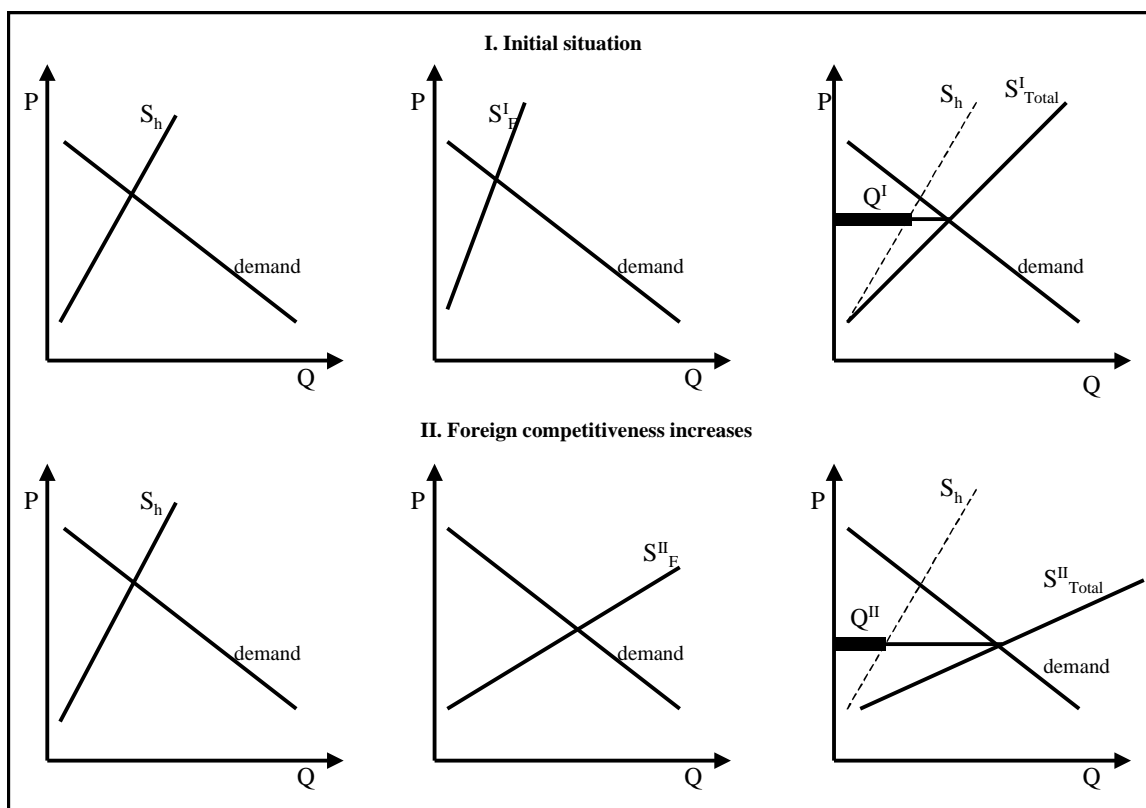
Finally, we conclude this section with a review of the usefulness of key economic indicators of structural problems used in the literature.

3.1 Loss Of Domestic Competitiveness

We consider first the situation where domestic producers face increasing difficulty in selling their products as cheaper imports increasingly penetrate the domestic market.

¹⁸ In this analysis, we abstract from economy-wide price movements (i.e. inflation) .

Figure 1



In Figure 1 above we illustrate the types of price and quantity movements one is likely to observe in a case of a domestic industry facing increased competition from imports.

In the initial situation we have a given level of domestic supply (s_h) and foreign supply (s^I_F) to which corresponds a given level of domestic production (Q^I) and imports.

When foreign producers become more competitive the foreign supply curve shifts to the right (s^{II}_F) and, at the new equilibrium, domestic production is lower (Q^{II}) and imports are higher.

In this case, no decrease in demand is observed for this industry but the domestic production is nonetheless lower. In such a situation, one will observe an increase in apparent consumption while, simultaneously, domestic firms face increasing difficulties.

Provided the demand curve is downward sloping, the price will decrease. But, the magnitude of the price decline will depend on the slope of the demand curve. The more elastic the demand curve is, the larger the price reduction that is necessary to restore equilibrium in the market.

The value of domestic production unambiguously declines as both domestic production and the price fall. In contrast, the effect of increased foreign competition on the value of consumption (i.e. total sales) is unclear as the volume of sales increases while the price declines. The net combined effect of these two changes depends on the elasticity of the demand curve.

To summarise, the volume and value of domestic production, and, provided the demand curve is downward sloping, the market price unambiguously decline while total consumption (in volume) increases. However, the net effect of consumption in value depends on the elasticity of the demand curve.

Table 3-1: Potential Price and Output Changes in Case of Increase in Foreign Competition

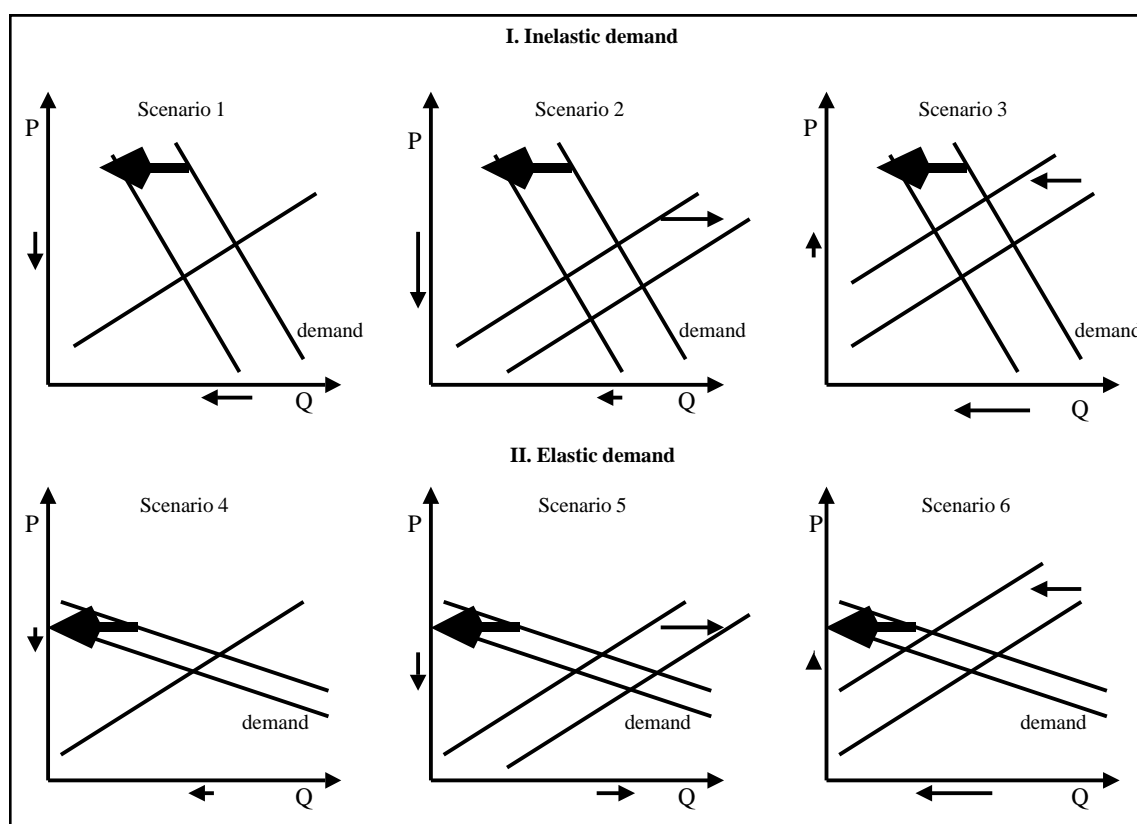
Direction of change in production in volume	Direction of change in production in value	Direction of change in consumption in volume	Direction of change in price	Direction of change in consumption in value
-	-	+	-	?

3.2 Declining Demand

A common interpretation of structural decline is that aggregate demand (domestic and/or foreign) for an industry's product(s) is decreasing over time. In this section we analyse a number of possible scenarios of such a decline in demand¹⁹ and review the associated patterns of changes in prices, and volume and value of production/consumption.

¹⁹ For simplicity, we abstract from any imports and assume that all supply is domestically produced. As well, we abstract from any variations in inventory holdings.

Figure 2



The various scenarios are presented in the figure above. The thick arrows depict an equal fall in demand in all 6 cases:

- In the top three cases the demand is relatively inelastic and in the bottom three cases the demand is relatively elastic;
- Moreover, scenarios 1 and 4 assume no change on the supply side;
- Whereas, in scenarios 2 and 5, the market supply curve shifts outward (i.e., the supply increases). This is a distinct possibility even in a declining industry. It may occur as a result of technological changes that reduce production costs or it may be caused by entry of more firms into the industry, a possibility that cannot wholly be ruled out.²⁰ Additionally, firms in the industry may turn to low-cost strategies to gain market share, increasingly competing with each other on price rather than on quality or on product innovation.

²⁰ The advent and rapid expansion of mini-mills in the steel sector is a good example of the effect of technological innovation on entry and output expansion in a declining industry.

- In contrast, scenarios 3 and 6 assume a contraction of the market supply curve. This may be due to increasing costs of inputs or/and firms leaving the industry.

In only two scenarios (scenarios 1 and 4) do the price and quantity variable unambiguously decline. These are the two scenarios where the supply curve does not shift following an inward shift (decrease) of the demand curve.

In all the cases, where the demand and supply curves move, the direction of the change in either price or quantity is undetermined and depends on the magnitude of the shifts in the demand and supply curves and the demand and supply price elasticities.

The precise relationship between shifts in demand and supply curves and resulting changes in price and quantity is derived more formally below.

We use a very simple demand and supply model where demand (Q^d) is negatively sloped in prices (equation 1) and supply (Q^s) is positively sloped in prices (equation 2)²¹.

Equation 1 $Q^d = a + b * P$ with $b < 0$

Equation 2 $Q^s = c + d * P$ with $d > 0$

As at equilibrium $Q^d = Q^s$, the following reduced form equation of the equilibrium price (P^e) is obtained

Equation 3 $P^e = (1/(b-d)) * (c-a)$ or

Equation 4 $\Delta P^e = (1/(b-d)) * (\Delta c - \Delta a)$ where Δa represents a shift in the demand curve and Δc represents a shift in the supply curve.

By definition, the term $1/(b-d)$ in equation 4 is negative as $b < 0$ and $d > 0$. A decrease in demand (i.e., an inward shift of the demand curve) implies $\Delta a < 0$. Similarly, an inward shift in the supply curve implies $\Delta c < 0$ while an outward shift in demand implies $\Delta c > 0$.

Equation 4 can now be used to assess the impact on equilibrium prices in the wake of an inward shift of the demand curve and an inward or outward shift of the supply curve. Obviously, in the case where only the demand curve shifts inwards the equilibrium price decreases. Similarly, when the demand curve shifts inward and the supply curve outward, the equilibrium price falls unambiguously.

The only scenario where the equilibrium price outcome is uncertain is the scenario combining an inward shift in the demand curve with an inward shift in the supply curve. As shown below, the equilibrium price will fall only if the size of the inward shift of the demand curve (Δa) is larger in absolute value than the size of the inward shift of the supply curve (Δc). If the supply

²¹ For simplicity, Q and P are assumed to be the log of q and p . Thus, the coefficients b and d represent the respective demand price and supply price elasticities.

curve were to shift by more than the demand curve, then the equilibrium price will increase.

Table 3-2: Impact on equilibrium price of various combinations of demand and supply shifts		
Shift in demand	Shift in supply	Impact of equilibrium price
$\Delta a < 0$	--	$\Delta P^e < 0$
$\Delta a < 0$	$\Delta c < 0$	$\Delta P^e < 0$ if $ \Delta c > \Delta a $
$\Delta a < 0$	$\Delta c < 0$	$\Delta P^e = 0$ if $ \Delta c = \Delta a $
$\Delta a < 0$	$\Delta c < 0$	$\Delta P^e > 0$ if $ \Delta c < \Delta a $
$\Delta a < 0$	$\Delta c > 0$	$\Delta P^e < 0$

Equations 1 and 2 can also be used to analyse the impact on the equilibrium quantity, by first rewriting these two equations as price functions and then solving the two equations systems for the reduced form of the equilibrium quantity (Q^e).

Equation 5 $P = -(a/b) + (1/b) * Q^d$

Equation 6 $P = -(c/d) + (1/d) * Q^s$

Thus,

Equation 7 $Q^e = (1/(d-b)) * (d*a - b*c)$ or

Equation 8 $\Delta Q^e = (1/(d-b)) * (d*\Delta a - b*\Delta c)$

By definition, the term $1/(d-b)$ is positive in equation 8. Thus, the equilibrium quantity will unambiguously decrease in cases where either only the demand curve shifts inward or both the demand and supply curve shift inward. In the case where the demand curve shift inward and the supply curve outward, the sign of the change in the equilibrium quantity depends on both the magnitude of the demand and supply shifts and the demand and supply price elasticities (equation 9 below).

Equation 9 $\Delta Q^e < 0$ if $(d^* \Delta a - b^* \Delta c) < 0$ or

Equation 10 $\Delta Q^e < 0$ if $\Delta a < (b/d)^* \Delta c$

If the demand and supply price elasticities are identical in absolute value (i.e., $|b| = |d|$), then the impact on the equilibrium quantity will simply depend on the magnitude of the demand and supply shifts and will decrease whenever the inward demand shift (Δa) is greater in absolute value than the outward supply shift.

In the cases where the two price elasticities are not identical, the net impact on the equilibrium quantity will depend on both the magnitude of the outward supply shift and the ratio of the demand price elasticity to the supply price elasticity. Many different combinations of these three factors are possible and it would be impossible to summarize them all here. However, it is worth noting that the smaller (in absolute value) the demand price elasticity (i.e., the term b in equation 10), the greater the likelihood that the equilibrium quantity will fall.

Table 3-3: Impact on equilibrium quantity of various combinations of demand and supply shifts

Shift in demand	Shift in supply	Impact of equilibrium price
$\Delta a < 0$	--	$\Delta Q^e < 0$
$\Delta a < 0$	$\Delta c < 0$	$\Delta Q^e < 0$
$\Delta a < 0$	$\Delta c > 0$? impact on Q^e depends on magnitude of demand and supply shifts and demand and supply price elasticities

This brief analysis illustrates clearly shows that price (P) and (Q) do not decline necessarily unambiguously in the case of a structural decline in demand if supply shifts as well. As note above, the key factors that will condition the observed pattern of price and output responses are the price elasticities of the demand and supply curves, and the relative size of the supply and demand shifts.

However, in all the cases where the shift in supply (i.e., Δc) is smaller in absolute value than the shift in demand (i.e., Δa) the impact on equilibrium price and equilibrium quantity are negative²².

Table 3-4: Potential Price, Volume and Value Changes in Case of Decline in Demand			
Case	Direction of change in prices	Direction of change in output/consumption in volume	Direction of change in output/consumption in value
Inward demand shift, no change in supply $\Delta a < 0, \Delta c = 0$	-	-	-
Inward demand shift, inward supply shift $\Delta a < 0, \Delta c < 0$?	-	?
Inward demand shift, outward supply shift $\Delta a < 0, \Delta c > 0$	-	?	?

3.3 Tracking Output And Apparent Consumption: Constant Prices Versus Current Prices

In the cases where the decline is driven by declining demand, there are a number of scenarios under which both prices and quantities go down. The fact that prices are decreasing along with quantities is an important piece of information to assess the level of decline in the market.

In all scenarios of declining demand illustrated in Figure 2 the product PQ (i.e., value) goes down but in some cases we see that either P or Q (i.e., volume), taken in isolation, go up.

For example, in scenario 5, despite an inward shift of the demand curve, we observe that output and actual consumption increases. This is because supply increases and because demand is quite price elastic. Decreases in production costs reflected in the outward shift of the supply curve have a large impact on quantity demanded that more than offsets the effect of the

²² In the case of the impact on the equilibrium quantity, a supplementary condition is that the ratio of the demand price elasticity to the supply price elasticity is smaller than or equal to 1 in absolute value.

inward shift of the demand curve. The increase in quantity is likely to be relatively smaller than the decrease in prices so the most likely outcome is still that the product PQ (value) decreases.

Scenarios 3 and 6 show how a contracting supply can hide contracting demand beneath the appearance of increasing prices. But, in both these scenarios, quantity goes down substantially so that the change of the product PQ is still negative.

As noted at the end of Section 3.2, in many instances the a priori undetermined impact of shifts in demand and supply on the equilibrium price and quantity is eliminated if the supply shift is smaller than the demand shift. In these cases, output in value (PQ) drops unambiguously.

These arguments point to the usefulness of the product PQ (value) to assess market decline. In other words, it suggests focusing on changes of output at current prices together with changes at constant prices rather than changes in either output at constant prices alone²³ or on prices on their own.

3.4 The Life-Cycle Model

The decline of an industry is often associated with the notion of product life cycle. A typical life-cycle model includes the following stages: product development, market introduction, market growth, market maturity and market decline. Of particular interest for this project are the last two stages – market maturity and market decline.

Market maturity occurs when industry sales stop growing. Competition gets tougher as aggressive competitors enter the race for market share. Industry profits are decreasing during the maturity phase because competition is based mostly on price.

New firms may still enter the market during this stage. These late entries may have some comparative cost advantage and thus manage to take market share from established firms. This is a stage where the EEA producers would most likely be exposed to the risk of entry of cost-competitive imports from outside the EEA.

In Europe, the markets for most cars, television sets, and household appliances are generally assumed to be at the stage of maturity. This stage may continue for many years -- until a new product idea comes along that makes the old product concept obsolete -- even though individual brands or models come and go.

During the maturity phase, less efficient firms will have difficulty keeping up with the increasingly tough price competition. State intervention to help such

²³ It is important to note that a decline in output in volume does not imply a declining industry as it may simply reflect an inward shift of supply and an unchanged demand. In this case, however, the equilibrium price increases.

companies stay afloat will not ultimately succeed and the economy may be best served if they are allowed to eventually exit the market.

Market maturity for an entire industry may continue for many years until eventually the market enters into decline. During the market decline stage, new products replace the old. Aggregate demand for the original products gradually decreases. Price competition among declining products becomes ever more vigorous.

During both the maturity and the decline stages firms with strong brands may continue to make profits because they successfully differentiate their products.

Based on the lessons from the life-cycle model we expect to observe the following in declining industries: decreasing profitability, decreasing prices (relative to the CPI or some other economy-wide price index), decreasing domestic output, and a decreasing number of domestic firms.

If employment were somewhat flexible one would also expect domestic employment in the sector to be decreasing, perhaps with a lag.

If physical capacity cannot be immediately adjusted, one will likely observe a period of excess installed capacity or under-utilisation of capacity. This will occur because capacity adaptation takes time and because expectations of the industry firms are not perfect. They may not be able to distinguish immediately between a temporary and a permanent shock to the industry.

3.5 Market Definition

The notion of industrial decline can be applied to finer or coarser sectoral definitions with differing results. One can apply it to a product class (e.g. gasoline-powered automobiles), a product form (e.g. sports cars), or a model.

If a market is defined broadly, there may be many competitors, and the market may appear mature. On the other hand, if the focus is on a narrow sub-market, and a particular way of satisfying needs, then one may observe much shorter life cycles as improved product ideas come along to replace the old ones.

A broadly defined sector may be in maturity or decline and yet there may be niches of relatively high growth within the sector. Conversely, a relatively healthy sector may include a number of products that have lost their market as they were substituted for newer and more innovative ones.

Sectors that are in decline due to declining demand may be related to consumer needs that have either disappeared or lost relative importance, or needs that are now being satisfied by other types of products.

A too fine definition of sector would not yield very useful information. Consider for example the field of consumer electronics. One can see fast declining demand for product models as they are substituted by the newer versions with more and better features. Clearly this does not signal that the

sector is in decline. This is often the case when new product versions, product updates, and small innovations are delivered by the firms already in the market.

Sectors that are in decline due to loss of competitiveness are likely to be highly similar in terms of their inputs as the loss of international competitiveness is mostly equivalent to foreign competitors having access to inputs at more favourable terms than domestic producers. This may reflect greater abundance of cheaper inputs abroad or perhaps lack of specific inputs domestically. In such a case, the sector aggregation level should be set at a level that would regroup most of the industries relying on these no-longer competitive inputs.

This method has a considerable disadvantage in that it may give rise to a too broad "List of sectors". Say, for example, one concludes that the competitive advantage from foreign producers comes from the fact that they have access to relatively inexpensive non-specialised labour. One would then conclude that a decline is to be expected in all sectors where non-specialised labour constitutes a relatively important input.

In practice, the chosen level of aggregation will need to be meaningful and useful while taking into account the points that were raised above. In the methodology section, we will return to this issue of aggregation.

In practice, the chosen level of aggregation will be largely dependent on the availability of data and will need to reconcile the conflicting objectives of being broad enough to keep the number of industries on the list to a limited number while being narrow enough to avoid imposing a blanket prohibition on sub-sectors that may show solid growth despite being in a sector that, at a broader level, is in decline.

3.6 Alternative Indicators

Whether a decline is being brought about by declining demand or by increased competitiveness of foreign producers, one expects both situations to have a number of common characteristics. One would most likely observe decreases in the following domestic industry aggregates:

- Apparent consumption
- Output
- Capacity utilisation
- Number of firms
- Employment
- Profitability
- Prices

The difficulty is that most of these indicators will not unambiguously identify a declining industry.

The alternative indicators may not all give us the same answer and will have different properties in terms of the two types of errors that concern us most in this context.

One, often called “type I” error corresponds to a situation where an industry is characterised as being in decline while it is not. This is a type of error that we believe should be avoided as much as possible in establishing the “List of sectors”.

The other error, called “type II” error, corresponds to a situation where an industry is not identified as being in decline while in reality it is. Some might argue that this is a less damaging error as the assessment required by the Multisectoral Framework will catch those industries that slip through the net when the List of sectors is established. In reality, however, it will be important to avoid as much as possible “type II errors” as well as only very large projects (i.e. above € 100 million) have to be notified and, in some sectors, investments just below that threshold may still expand capacity significantly. Moreover, such case-by-case product-based assessments are only very imperfect substitutes for assessments of the state of a sector.

We will next proceed with an overview analysis of each of the main indicators and assess the likelihood of “type I” and “type II” errors for each.

3.6.1 Apparent consumption

As shown earlier in this Section, if the sectoral decline is due to a loss of international competitiveness, apparent consumption will actually increase in volume terms and may increase in value terms, depending on the elasticity of demand.

Therefore, if the policy focus is on developments in the market and not on industry performance, the use of apparent consumption does not raise any issues.

If, however, the focus is on industry performance, one should note that the use of a decline in apparent consumption as an indicator of sectoral decline runs a very high risk of committing a “type II” error as an increase in apparent consumption can mask a decline in domestic production caused by increased foreign competition in the domestic market.

Conversely, a combination of weaker imports and stronger exports may result in a situation where apparent consumption declines while domestic production is robust as a result of strong exports. A classical example of such a case is the situation following a major negative terms of trade shock, such as a depreciation of the domestic currency vis-à-vis foreign currencies, which boosts exports while dampening domestic consumption and imports. In such a case, the use of apparent consumption as an indicator of the state of the industry would result in a “type I” error, wrongly classifying the industry as being in decline.

Thus, the policy usefulness of the apparent consumption indicator depends critically on the locus of the policy focus. If the policy focus is on the state of the domestic market, then apparent consumption is a useful indicator. If, however, the policy focus is on the state of the industry, apparent consumption is not very useful as the risk of committing either “type I” errors or “type II” errors is high.

In the next paragraphs we review the usefulness of a number of other industry performance indicators. In the subsequent analysis we consider only the case of a decline in demand as domestic output falls unambiguously in case of a loss of international competitiveness.

3.6.2 Output

As we have shown above, output in volume terms does not necessarily decline unambiguously in the case of a simultaneous decline in domestic demand and an outward shift in supply. There is a risk of a “type II” error if the focus is on output in volume terms alone as one may observe an increase in output despite a fall in demand. As noted in the previous section, this would be the case when the supply curve shifts outward while the demand falls and the supply expansion is greater than the demand contraction. In practice, however, this is unlikely to often be the case and the risk of a “type II” error should be rather small.

3.6.3 Gross output versus value added

Gross output is defined as the gross value of production (in constant or current prices) and includes 1) the costs of materials and other intermediate inputs and 2) value added.

While the variables are frequently used production measures, they will not necessarily always provide a quantitatively unambiguous estimate of a decline or increase in production. Indeed, the share of value added in gross production, especially the capital income share may get squeezed in case of a sharp decline in gross output as the cost of materials may not necessarily decline proportionally with the decline in gross output.

However, it is unlikely that the signs of the direction of the change in the two indicators will diverge for prolonged periods.

3.6.4 Prices

Using changes in prices as an indicator of declining demand also runs the risk of committing a “type I” error if prices are decreasing due to technological developments that have reduced production costs significantly. Prices could also be decreasing due to aggressive competition and this could simply be due to the increased openness of markets, for example. This would be another case where a “type I” error would be more likely.

Is it likely, on the other hand, that we would see prices increasing in a declining industry? We have seen that this is indeed a possibility (recall scenarios 3 and 6). In these scenarios demand is falling and the aggregate supply in the market also declining. If the decline in supply is due to firms leaving the market in reaction to lower demand it is unlikely that this would cause prices to rise. For prices to rise supply has to decrease faster than demand. But, typically exiting a market takes time and/or has costs and thus firms are relatively slow to react to changes in demand.

The decline in aggregate supply may also be due to an increase in the cost of inputs. Rising input costs, either domestic or imported, will shift the supply curve inward, independently of either firm exit or capacity withdrawals. Thus, even in declining industries faced by weak demand, it is possible to observe decreases in supply (i.e. inward shifts of the supply curve). Yet, it seems somewhat unlikely that a sustained increase in production costs could by itself contract supply enough by more than the decline in demand, and thus result in a higher rather than lower price.

In conclusion, we believe that prices as an indicator of decline are subject to “type I” errors while a “type II” error seems relatively improbable. Given the importance we attribute to avoiding “type I” errors, we believe that decreasing prices, on their own, are a relatively poor stand-alone indicator of structural decline for the purpose of establishing the “List of sectors”.

3.6.5 Output at current prices

As we mentioned already, we believe that it is preferable to focus on output at current prices as this minimizes the risk of a “type I” error, especially when used in conjunction with output in constant prices. In practical terms, this means tracking either the production, value-added or turnover at current prices.

Obviously, in periods of high inflation, one would need to adjust the changes in the value of output for the general inflation trend. In a low inflation environment, this is much less of a concern as observed price movements reflect mainly real price changes.

3.6.6 Number of firms

The number of firms may be decreasing because the realisation of economies of scale and scope available through consolidation makes this attractive or because, within an industry, some products become winners while others loose favour with consumers. Moreover, as the industrial life cycle literature points out, the number of firms in an industry often declines sharply during the consolidation phase that follows the birth phase and precedes the maturity phase.

In all these examples we could commit a “type I” error if we were to rely on the decline of the number of firms as an indicator of industrial decline.

Alternatively we can observe a steady number of firms despite a declining demand because there are exit barriers or simply because firms do not directly observe declines in demand and, even if they did, they may not be able to determine whether that decline is permanent.

It could be additionally informative to break down changes in the number of firms into number of new firms and number of existing firms. An industry with a high number of new entrants should be taken as a clear identification of a non-declining industry.

A priori it is impossible to determine which of two errors are most likely to occur. Therefore, the use of the trend in the number of firms as a stand-alone indicator of sectoral decline should be treated with considerable caution.

3.6.7 Depreciation, investment and capital stock

Mergers of existing firms reduce the number of firms operating in the industry but possibly not the total productive capacity installed. Mergers can have the objective of realising cost economies and may or may not be accompanied by a reduction in physical capital. However, an industry where, over an extended period of time, depreciating capital is not replaced with new capital investment will certainly appear to be an industry in decline.

Thus a declining capital stock combined with low investments could be a useful indicator of an industry in decline that has a low risk of “type I” error but a low or declining investment on its own would not be a reliable indicator as it would have a high risk of “type I” error.

3.6.8 R&D expenditures

There exists a significant body of literature that focuses on R&D spending over the life cycle of an industry. The general consensus of this strand of work is that, in general, R&D spending tends to be lower or declining in mature or declining industries²⁴. However, it is not possible to conclude from this body of work that, if one observes low R&D spending in an industry, the latter is necessarily mature or in decline as other factors besides the life cycle stage of the industry may affect the level of R&D spending²⁵. Conversely, an industry facing serious structural problems may invest heavily in R&D to develop new products and/or cost-reducing technologies. Therefore, using R&D as an indicator of demand decline may entail high risks of both “type I” and “type II” errors.

²⁴ For a theoretical discussion of this point see Klepper (1996).

²⁵ See for example Dasgupta and Stiglitz (1980).

3.6.9 Employment

Declines in employment are often used in the press to define declining industries. But, as employment may be falling in a growing sector due to large productivity gains combined with a low price elasticity of demand we would commit a serious “type I” error if we identified a declining industry on the basis of this indicator alone. That being said, it could be used to complement information derived from other indicators.

3.6.10 Profitability

In a product life-cycle framework industry-wide decline in profitability typically precedes industry decline. In the market maturity phase, when demand is no longer growing, the product is no longer a novelty and a number of competitors have entered the market, profits decrease as competition increasingly focuses on price. Declining profitability and industry maturity may however persist for a long time and it is often difficult to predict when a particular industry will move from maturity to decline.

Growing sectors may also have quite low levels of profitability if competition is very aggressive in the initial stages of the market. For example in industries where network externalities are important, firms need to establish a strong consumer base, which will make them more attractive to future consumers. This may lead to extremely aggressive pricing and thus profits are very low initially and will be perhaps rising in the future for the few firms that managed to establish large enough market presence and customer base.

In short, declines in profitability are not necessarily a good stand-alone indicator of a declining industry or sector as the risk of a “type I” error is high.

On the other hand, we do not expect that structural and persistent increases in profitability would be systematically associated with market decline. However, it is conceivable that, as weaker firms leave the market and only the more efficient ones remain, the average industry profitability may increase at least temporarily.

3.7 Absolute Declines Versus Relative Declines

So far, our discussion in the present section has focused on absolute declines in apparent consumption, production, employment, etc. This is entirely consistent with the Commission’s Communication that, as noted earlier in the report, presumed a sector to be in decline if apparent consumption was showing a fall (in absolute terms) over a five-year period.

But, unresolved is still the issue of how to characterise sectors that post positive growth but at a rate well below the economy wide growth rate. Depending on the current level of capacity utilisation, such sectors or

industries may require further increases in capacity in the future to meet the slowly growing demand.

Therefore, it would be inappropriate to include such sectors on the “List of sectors” as regional aid to a large investment may not necessarily distort competition and add to overcapacity in such sectors. Rather than passing a blanket judgement on the state of such sectors, it would appear preferable to subject, as planned, the slow-growth sectors to a case-by-case review of the eligibility of the regional aid.

3.8 Concluding Remarks

In this section we have reviewed the pattern that a number of economic indicators are likely to exhibit in declining industries.

Our review shows that there are a number of indicators that could be used and that would minimize the risks of committing the error of including on the “List of sectors” sectors/products that are not in decline. Such indicators are apparent consumption in value, and production (in volume and value). The choice of either one will depend on the locus of policy focus.

Prices, employment, capacity and investment and the number of firms in an industry, when used on a stand-alone basis, are less robust indicators. However, they could be used in conjunction with a production indicator and, if all indicators were to move in the same direction, this would be a strong indication that the sector is really in decline.

4 Data availability

4.1 Introduction

In this section, we report on the results of our discussions with officials from Eurostat. We have also contacted all the national statistical agencies from the EEA and a large number of pan-European industry associations or federations. The result of this latter work is reported in greater detail in Section 5.

4.2 The Eurostat data

From our extensive discussions with Eurostat officials we concluded that there exist four different data sources that potentially could be used to establish a “List of sectors” that would not be eligible for regional State aid because they are in decline. These four potential sources are the following:

1. The European System of Accounts (based on national accounts data), ESA 1995, Table 3: Tables by industry – annual exercise;
2. The Structural Business Statistics;
3. The products database Prodcom; and.
4. Monthly and Quarterly Short Term Statistics

In the course of the project, it became clear however, that the first three sources would not be very helpful in drawing up a List of sectors as there were many missing data and, more importantly, it proved either impossible or very difficult to aggregate the very detailed data to a somewhat less detailed level of disaggregation that would be required for establishing the List.

We have also had in-depth discussions with Eurostat officials on the possibility of accessing detailed employment data for the purpose of the study²⁶. We recognize that employment data would most likely be a relative poor stand-alone indicator of structural developments in an industry as labour productivity may grow even in a declining industry. Nevertheless, for the sake of completeness, we investigated the potential availability of such information as a possible complement to other statistical information. However, according to the Eurostat officials, besides the employment data collected for the purpose of the “Industry Table 3” of the national accounts and the Structural Business Indicators, there exists no other detailed and

²⁶ We reviewed the three main source of employment information, namely the Labour Force Survey, the business or employer surveys and the administrative sources of employment information such as social security or unemployment records, and discussed the advantages and disadvantages of each.

reliable pan-European employment data source that would be useful for the present study.

Below we review in greater detail each of the four Eurostat data sets, focusing in particular on the suitability of each for establishing a “List of sectors”.

4.3 The Data In “Table 3 Of Tables By Industry” In The National Accounts

4.3.1 Description of the data set

Of all potentially useful Eurostat data set, these are among the most timely as they are published only nine months after the end of the reference year.

This annual data set provides information about production and value added (in current and constant prices) and employment for the EU, EEA and EU accession countries going back to the early nineties, although the quality of the data for the latter group of countries is not as good as for the first two groups (see Table 4.1).

Unfortunately, the data are available only at a relatively aggregated level, namely the 2-digit classification of Nace Rev. 1. In short, information is provided, among others, for the following 14 manufacturing industries and 5 commercial services industries: manufacture of food products; beverages and tobacco; manufacture of textiles and textile products; manufacture of leather and leather products; manufacture of wood and wood products; manufacture of pulp, paper and paper products; publishing and printing; manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals, chemical products and man-made fibres; manufacture of rubber and plastic products; manufacture of other non-metallic mineral products; manufacture of basic metals and fabricated metal products; manufacture of machinery and equipment n.e.c; manufacture of electrical and optical equipment; manufacture of transport equipment; manufacturing n.e.c; wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods; hotels and restaurants; transport, storage and communication; financial intermediation; and, real estate, renting and business services

Moreover, at the present time, no EU or EEA wide aggregates are published because some national statistical agencies have not provided the required data.

Table 4.4-1: Data Source: ESA95 Table 3 Tables by Industry

Evaluation criterion	
Data frequency	Annual
Timeliness	Data are available at T+9m, i.e. in principle 9 months after the end of the reference period
Availability back in time	Data for all countries go back to the early 1990s and for some countries extend much further back in time to the early 1980s
Variables covered	In current prices In constant prices Units
Apparent consumption	
Total sales	
Exports	
Imports	
Production	
Gross output	√ (at basic prices)
Gross value added	√ (at basic prices) √
Employment	√ (in 000's)
Hours worked	√ (provided on a voluntary basis until 2003)
Investment	√
Capacity utilisation rates	
Profits or profitability	
Level of aggregation	Nace Rev. 1 classification, 2 digit classification
Sectors included	Sectors of interest for project: 14 manufacturing sectors, 5 commercial services
Geographical coverage	European Union European Economic Area EU Accession Countries
Confidentiality issues	None
Missing data issues	This is a problem as some national statistical agencies have not provided all the necessary data but Eurostat has just completed an exercise aiming to generate estimates of the missing data points and can now provide EU-wide aggregates

In sharp contrast to the next two potential datasets from Eurostat, all the information collected is publicly available as confidentiality is not an issue at this level of aggregation.

4.3.2 Concluding Remarks

The bottom line is that this data set may be helpful in identifying broad sectoral trends such as high-growth industries and low-growth industries but is not sufficiently detailed to help define the “List of sectors”.

4.4 The Structural Business Statistics

4.4.1 Description of the data set

The second potentially useful data set is the data collected for the compilation of the Structural Business Statistics (SBS) produced by Eurostat.

The SBS database flows from the Council regulation on Structural Business Statistics²⁷. This regulation provides a harmonised framework for the annual collection of data describing the activity of businesses in the European Union. The data collection is carried out by the National Statistical Institutes, and the aggregated data are transmitted to Eurostat, which calculates pan-European totals. The regulation applies to all market activities (except agriculture) normally included in industry, construction, the distributive trades and services (sections C to K of Nace Rev.1).

Until the reference year 1994 inclusive, EU Member States transmitted the data to Eurostat according to the then-prevailing legal requirements. Eurostat has converted these data in line with the requirements of the 1996 Regulation on structural business statistics that governs the collection and transmission of the structural business statistics from the 1995 reference year onwards.

However, when using the pre-1995 data, Eurostat officials warned that it is important to remember that these data are the result of a conversion and thus are not necessarily of the same quality as the data collected from the 1995 reference year onwards.

Detailed information about this dataset is provided in Table 4.2 and some key facts are presented below.

- q SBS is a potentially rich data set as it provides information on a large number of industry characteristics such as the number of enterprises, total sales, production, value added, gross operating surplus, investment and employment. Therefore, the data set could be an excellent source of information for analysing the growth dynamics of an industry.

²⁷ Until the 1994 reference year (1994 included), the legal basis governing the transmission of structural business statistics to Eurostat were two Council Directives dating back to 1964 and 1972 covering respectively investment and structure and activity. The legal basis was modified by the adoption of a new Council Regulation on structural business statistics (Regulation (EC, EURATOM) N° 58/97 of 20 April 1996 concerning structural business statistics, (OJ No L 14/1 of 17.1.97, p.1)). The SBS Regulation governs the transmission of data to Eurostat from the reference year 1995 onwards and covers all market activities in sections C to K and M to O of NACE Rev. 1.

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- q The data is published at different levels of disaggregation: 5-digit, 4-digit, 2-digit and 1-digit Nace Rev. 1 for the EU15 total²⁸ and for countries individually. EU-wide aggregates are produced only for manufactured goods and EU-wide aggregates for services will be released shortly for the 1999 and 2000 reference years.
 - q Production, value added, turnover, operating surplus and investment data exist at current prices and constant prices for enterprises with 20 persons employed and more at the aggregate EU15 level since 1985.
 - q The data at current prices is also available individually for all enterprises and for Member States²⁹ and Norway since 1995³⁰ and EU accession candidates since 1999.
 - q In addition, there is also data available for the number of births and deaths of enterprises for individual countries³¹ and all enterprises.

²⁸ Some EU15 totals are estimated because of missing country data.

²⁹ Many of the data for Germany and Greece are missing.

³⁰ Most of the data for Iceland and Lichtenstein are also missing. A close approximation of the true EEA-wide aggregate can be constructing be adding the data for Norway to the EU-15 aggregate as the economic weight of Iceland and Liechtenstein in the EEA aggregate is very small.

³¹ Aggregate data on EU15 is not available.

Table 4.2 Data Source: Structural Business Statistics

Table 4.2 Data Source: Structural Business Statistics			
Evaluation criteria			
Data frequency	Annual		
Timeliness	Very detailed data are available at about T+21/22m after the end of the reference period. The data have to be submitted to Eurostat by month 18 after the end of the reference period and another 3 to 4 months are required for internal checking		
Availability back in time	Data are only consistently available from 1995 onwards though some longer time series exist for some variables for enterprises with 20 employees and more		
Variables covered	In current prices	In constant prices	Units
Apparent consumption			
Total sales (Turnover)	√	√ (only for enterprises with 20 or more employees)	
Exports			
Imports			
Production			
Gross output	√	√ (only for enterprises with 20 or more employees)	
Gross value added (at factor costs)	√	√ (only for enterprises with 20 or more employees)	
Number of enterprises			√ (including number of births and deaths)
Employment			√
Hours worked			√
Investment	√ (including gross investment in land, buildings and structures, and machinery and equipment)		
Capacity utilisation rates			
Profits or profitability	√ (gross operating surplus)		
Level of aggregation	5-digit, 4-digit, 2-digit and 1-digit Nace Rev. 1.		
Sectors included	Nace Rev 1 C to F -- goods. Nace Rev 1 G to K -- services (not available for aggregate EU15).		
Geographical coverage	European Union European Economic Area (Norway only) EU Accession Countries (Since 1999 only)		

Table 4.2 Data Source: Structural Business Statistics

Evaluation criteria	
Data frequency	Annual
Confidentiality issues	About 40% of the industry sectors (5-digit) is not published because of confidentiality issues and missing information.

Unfortunately, the data set suffers from a number of major problems:

- q It is not very timely as the detailed data are released only 21 to 22 months after the end of the reference year.
- q Reliable data go only back to 1995. The long publishing lag implies that it is, at the present time, impossible to compute the change in 5-digit variables over a period of 5 years as the last year for which data is publicly available is 1999. However, data are available for earlier years at higher levels of aggregation (see Annex 2 a full overview of the availability of the SBS data at various aggregation levels).
- q The data set is “plagued” by confidentiality overrides and a large amount of the information gathered by Eurostat is not made public for EU15. It is impossible to create a meaningful EU- or EEA-wide aggregate because some data points are declared confidential by one or more of the Member States.
- q In a number of instances, missing data points may simply be due to the fact that national authorities did not report the necessary information.
- q The confidential and missing data points vary somewhat from year to year, reducing even further the information available for analysis over time.
- q The variables at Nace Rev 1 for sectors G to K (i.e., the services industries) are only available on a country basis. Aggregation to an EU15-wide measure is impossible due to the number of confidential values and large gaps in the data for some countries.
- q In Table 4.3 we present the availability of information at 5-digit level. Of note is the fact that, for the 121 sub-sectors at a 5-digit level, around 40% of the values are missing for the production, value added, and turnover variables.

Table 4.3: Number Of Industries For Which Information On Production, Value Added And Turnover Is Available at a 5-digit classification (EU15)

	1995	1996	1997	1998	1999
Production					
Potential number of industries	121	121	121	121	121
Number of industries for which a value is available	78	41	51	55	55
Number of industries with confidential values	21	55	50	46	46
Value Added					
Potential number of industries	121	121	121	121	121
Number of industries for which a value is available	78	41	53	56	56
Number of industries with confidential values	21	55	45	45	45
Turnover					
Potential number of industries	121	121	121	121	121
Number of industries for which a value is available	78	41	53	56	56
Number of industries with confidential values	21	55	45	45	45
Production value measures the amount actually produced by the unit, based on sales, including changes in stocks and the resale of goods and services.					
Value added at factor cost is the gross income from operating activities after adjusting for operating subsidies and indirect taxes.					
Turnover comprises the totals invoiced by the observation unit during the reference period, and this corresponds to market sales of goods or services supplied to third parties.					

4.4.2 Industry growth dynamics

In this sub-section we analyse the EU-wide growth dynamics of the various industries for which data are available in the SBS databank to illustrate how the data set could be used to construct the "List of sectors".

In tables 4.4 to 4.7 we report the rate of growth over the past years at different levels of aggregation. We use data from the time series that cover enterprises with 20 persons employed and more. For 1 and 2 digit levels we computed the growth rate for the past 5 years, i.e. 1996 to 2001. For data at the 4-digit level we computed the growth rate from 1995 onwards because there were fewer missing values (or confidential) than in 1996. Finally, since apparent consumption data at a 5-digit level are only available up to 1999 we computed the growth rate from 1995 to 1999.

A number of interesting points are worth noting:

1. No industry posts an output decline over the 5-year period of 1996 to 2001 at the 2-digit or 4-digit level of aggregation. But, at the 4-digit level, two industries ("Manufacture of wearing apparel, dressing, dyeing of fur" and "Manufacture of basic metals") show a decline in value added over this period;
2. At the 5-digit level, there are many missing data points. Out of 101 industries, information on production is available only for 41 industries. Of these 41 industries five ("Manufacture of knitted and crocheted articles", "Manufacture of basic iron and steel and of ferro-alloys (ECSC)", "Manufacture of tubes", "Manufacture of watches and clocks" and "Manufacture of musical instruments") show a decline in production over the period 1995 to 1999. It is also interesting to note that the correlation between changes in output and valued added appears to be very low;
3. While there is presently only very limited data available at the 5-digit level, the results show the potential pitfalls of stopping the analysis at a lower level of disaggregation such as the 4-digit level.
 - For example at the 4-digit level, the industry "Manufacture of medical, precision and optical instruments, watches and clocks" has experienced a huge increase in production (more than 50%) over the period 1995 to 2000. However, looking at a more disaggregated level (5-digit) we observe that the subcomponent "Manufacture of watches and clocks" has experienced a decrease of 5% over the period 1999-1995.
 - A similar case is provided by the industry "Manufacture of furniture; manufacturing n.e.c." which posts an increase in production of 25% between 1995 and 2001 whereas its sub-industry "Manufacture of musical instruments" shows a decrease of 5% between 1995 and 1999.

4. Furthermore, it is also interesting to note that the three variables production, value added and turnover are not always reported for each industry. This is clearly shown by the analysis at the 5-digit level.

Table 4.4: Rate of Growth 1996-2001 at the EU-15 Level
(Nace Rev.1 C to F 1 digit)

Code	Description 1 digit level	Production	VA	Turnover
D	Manufacturing	27%	24%	28%

Manufacturing output has grown at a rate of 27% over the period 1996 to 2001 (Table 4.4). But, as shown by Table 4.5, not all industries have benefited equally from the general economic upturn. Some industries such as the "Manufacture of textiles and textile products" and the "Manufacture of leather and leather products" experienced only sluggish production growth.

Table 4.5: Rate of Growth 1996-2001 at the EU-15 Level
(Nace Rev.1 C to F 2 digit)

Code	Description 2 digit level	Production	VA	Turnover
DA	Manufacture of food products; beverages and tobacco	12%	22%	12%
DB	Manufacture of textiles and textile products	4%	1%	4%
DC	Manufacture of leather and leather products	9%	4%	7%
DD	Manufacture of wood and wood products	26%	22%	26%
DE	Manufacture of pulp, paper and paper products; publishing and printing	23%	25%	22%
DF	Manufacture of coke, refined petroleum products and nuclear fuel	N.A.	N.A.	N.A.
DG	Manufacture of chemicals, chemical products and man-made fibres	29%	24%	28%
DH	Manufacture of rubber and plastic products	28%	26%	29%
DI	Manufacture of other non-metallic mineral products	21%	18%	22%
DJ	Manufacture of basic metals and fabricated metal products	23%	21%	22%
DK	Manufacture of machinery and equipment n.e.c.	17%	13%	21%
DL	Manufacture of electrical and optical equipment	41%	30%	45%
DM	Manufacture of transport equipment	52%	39%	54%
DN	Manufacturing n.e.c.	N.A.	N.A.	N.A.

In the next table (Table 4.6) we present the industry data at an even higher level of disaggregation. As was noted above, a large number of data point are not available.

**Table4.6: Rate of Growth 1995- 2001 at the EU-15 Level
(Nace Rev.1 C to F 4 digit)**

Code	Description of 4 digit industry	Production	VA	Turnover
DA15	Manufacture of food products and beverages	20%	28%	20%
DA16	Manufacture of tobacco products	N.A.	N.A.	N.A.
DB17	Manufacture of textiles	6%	6%	7%
DB18	Manufacture of wearing apparel; dressing; dyeing of fur	3%	-4%	4%
DC19	Tanning, dressing of leather; manufacture of luggage	15%	11%	16%
DD20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	27%	22%	28%
DE21	Manufacture of pulp, paper and paper products	N.A.	N.A.	N.A.
DE22	Publishing, printing, reproduction of recorded media	31%	37%	37%
DF23	Manufacture of coke, refined petroleum products and nuclear fuel	N.A.	N.A.	N.A.
DG24	Manufacture of chemicals and chemical products	31%	23%	31%
DH25	Manufacture of rubber and plastic products	30%	30%	32%
DI26	Manufacture of other non-metallic mineral products	21%	18%	22%
DJ27	Manufacture of basic metals	6%	-1%	7%
DJ28	Manufacture of fabricated metal products, except machinery and equipment	34%	33%	35%
DK29	Manufacture of machinery and equipment n.e.c.	24%	20%	28%
DL30	Manufacture of office machinery and computers	57%	14%	56%
DL31	Manufacture of electrical machinery and apparatus n.e.c.	27%	18%	31%
DL32	Manufacture of radio, television and communication equipment and apparatus	N.A.	N.A.	N.A.
DL33	Manufacture of medical, precision and optical instruments, watches and clocks	51%	42%	52%
DM34	Manufacture of motor vehicles, trailers and semi-trailers	59%	32%	65%
DM35	Manufacture of other transport equipment	91%	75%	94%
DN36	Manufacture of furniture; manufacturing n.e.c.	25%	22%	26%
DN37	Recycling	N.A.	N.A.	N.A.

Table 4.7: Rate of Growth 1995-1999 at the EU-15 Level (Nace Rev.1 C to F 5 digit)

Code	Description of 5 digit industry	Production	VA	Turnover
DA151	Production, processing, preserving of meat, meat products	5%	-1%	10%
DA152	Processing and preserving of fish and fish products	N.A.	10%	19%
DA153	Processing and preserving of fruit and vegetables	29%	N.A.	N.A.
DA154	Manufacture of vegetable and animal oils and fats	N.A.	-31%	-12%
DA155	Manufacture of dairy products	N.A.	29%	26%
DA156	Manufacture of grain mill products, starches and starch products	N.A.	N.A.	N.A.
DA157	Manufacture of prepared animal feeds	N.A.	N.A.	N.A.
DA158	Manufacture of other food products	23%	N.A.	N.A.
DA159	Manufacture of beverages	N.A.	N.A.	N.A.
DB171	Preparation and spinning of textile fibres	N.A.	14%	51%
DB172	Textile weaving	9%	10%	32%
DB173	Finishing of textiles	N.A.	24%	27%
DB174	Manufacture of made-up textile articles, except apparel	N.A.	N.A.	N.A.
DB175	Manufacture of other textiles	10%	N.A.	N.A.
DB176	Manufacture of knitted and crocheted fabrics	N.A.	N.A.	N.A.
DB177	Manufacture of knitted and crocheted articles	-16%	N.A.	N.A.
DB181	Manufacture of leather clothes	N.A.	N.A.	N.A.
DB182	Manufacture of other wearing apparel and accessories	13%	N.A.	N.A.
DB183	Dressing and dyeing of fur; manufacture of articles of fur	N.A.	N.A.	N.A.
DC191	Tanning and dressing of leather	16%	N.A.	N.A.
DC192	Manufacture of luggage, handbags and the like, saddler	N.A.	5%	9%
DC193	Manufacture of footwear	11%	5%	14%
DD201	Saw milling and planing of wood, impregnation of wood	31%	N.A.	N.A.
DD202	Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board, fibre board and other panels and boards	N.A.	N.A.	N.A.
DD203	Manufacture of builders' carpentry and joinery	N.A.	N.A.	N.A.
DD204	Manufacture of wooden containers	N.A.	N.A.	N.A.
DD205	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials	27%	37%	24%
DE211	Manufacture of pulp, paper and paperboard	N.A.	N.A.	N.A.
DE212	Manufacture of articles of paper and paperboard	N.A.	24%	21%
DE221	Publishing	N.A.	8%	15%
DE222	Printing and service activities related to printing	N.A.	-4%	-10%
DE223	Reproduction of recorded media	N.A.	12%	15%
DF231	Manufacture of coke oven products	N.A.	22%	29%
DF232	Manufacture of refined petroleum products	26%	N.A.	N.A.
DF233	Processing of nuclear fuel	14%	N.A.	N.A.
DG241	Manufacture of basic chemicals	9%	N.A.	N.A.
DG242	Manufacture of pesticides and other agro-chemical products	N.A.	N.A.	N.A.
DG243	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	N.A.	16%	34%
DG244	Manufacture of pharmaceuticals, medicinal chemicals and botanical products	36%	N.A.	N.A.
DG245	Manufacture of soap, detergents, cleaning, polishing	N.A.	N.A.	N.A.
DG246	Manufacture of other chemical products	24%	N.A.	N.A.
DG247	Manufacture of man-made fibres	N.A.	N.A.	N.A.

Table 4.7: Rate of Growth 1995-1999 at the EU-15 Level (Nace Rev.1 C to F 5 digit)

Code	Description of 5 digit industry	Production	VA	Turnover
DH251	Manufacture of rubber products	16%	N.A.	N.A.
DH252	Manufacture of plastic products	20%	N.A.	N.A.
DI261	Manufacture of glass and glass products	N.A.	18%	29%
DI262	Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products	10%	N.A.	N.A.
DI263	Manufacture of ceramic tiles and flags	18%	N.A.	N.A.
DI264	Manufacture of bricks, tiles and construction products	5%	10%	12%
DI265	Manufacture of cement, lime and plaster	N.A.	N.A.	N.A.
DI266	Manufacture of articles of concrete, plaster, cement	17%	N.A.	N.A.
DI267	Cutting, shaping and finishing of stone	N.A.	8%	8%
DI268	Manufacture of other non-metallic mineral products	N.A.	N.A.	N.A.
DJ271	Manufacture of basic iron and steel and of ferro-alloys (ECSC)	-15%	13%	19%
DJ272	Manufacture of tubes	-10%	N.A.	N.A.
DJ273	Other first processing of iron and steel and production of non-ECSC ferro-alloys	N.A.	N.A.	N.A.
DJ274	Manufacture of basic precious and non-ferrous metals	N.A.	10%	20%
DJ275	Casting of metals	N.A.	N.A.	N.A.
DJ281	Manufacture of structural metal products	25%	N.A.	N.A.
DJ282	Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers	13%	52%	63%
DJ283	Manufacture of steam generators, except central heating hot water boilers	N.A.	29%	40%
DJ284	Forging, pressing, stamping and roll forming of metal; powder metallurgy	N.A.	N.A.	N.A.
DJ285	Treatment and coating of metals; general mechanical engineering	N.A.	0%	0%
DJ286	Manufacture of cutlery, tools and general hardware	N.A.	N.A.	N.A.
DJ287	Manufacture of other fabricated metal products	19%	N.A.	N.A.
DK291	Manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and cycle engines	N.A.	N.A.	N.A.
DK292	Manufacture of other general purpose machinery	26%	N.A.	N.A.
DK293	Manufacture of agricultural and forestry machinery	14%	N.A.	N.A.
DK294	Manufacture of machine-tools	N.A.	N.A.	N.A.
DK295	Manufacture of other special purpose machinery	9%	29%	35%
DK296	Manufacture of weapons and ammunition	N.A.	8%	4%
DK297	Manufacture of domestic appliances n.e.c.	N.A.	N.A.	N.A.
DL311	Manufacture of electric motors, generators and transformers	N.A.	N.A.	N.A.
DL312	Manufacture of electricity distribution and control apparatus	N.A.	N.A.	N.A.
DL313	Manufacture of insulated wire and cable	N.A.	N.A.	N.A.
DL314	Manufacture of accumulators, primary cells and primary batteries	N.A.	18%	24%
DL315	Manufacture of lighting equipment and electric lamps	23%	N.A.	N.A.
DL316	Manufacture of electrical equipment n.e.c.	N.A.	15%	23%
DL321	Manufacture of electronic valves and tubes and other electronic components	N.A.	N.A.	N.A.
DL322	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	N.A.	N.A.	N.A.
DL323	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	N.A.	N.A.	N.A.
DL331	Manufacture of medical and surgical equipment and orthopaedic appliances	N.A.	16%	11%
DL332	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment	N.A.	21%	29%
DL333	Manufacture of industrial process control equipment	57%	N.A.	N.A.
DL334	Manufacture of optical instruments, photographic equipment	23%	N.A.	N.A.

Table 4.7: Rate of Growth 1995-1999 at the EU-15 Level (Nace Rev.1 C to F 5 digit)

Code	Description of 5 digit industry	Production	VA	Turnover
DL335	Manufacture of watches and clocks	-7%	N.A.	N.A.
DM341	Manufacture of motor vehicles	46%	N.A.	N.A.
DM342	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	N.A.	8%	11%
DM343	Manufacture of parts, accessories for motor vehicles	40%	22%	22%
DM351	Building and repairing of ships and boats	25%	-6%	-5%
DM352	Manufacture of railway, tramway locomotives, rolling stock	32%	N.A.	N.A.
DM353	Manufacture of aircraft and spacecraft	N.A.	N.A.	N.A.
DM354	Manufacture of motorcycles and bicycles	N.A.	N.A.	N.A.
DM355	Manufacture of other transport equipment n.e.c.	N.A.	N.A.	N.A.
DN361	Manufacture of furniture	28%	N.A.	N.A.
DN362	Manufacture of jewellery and related articles	N.A.	24%	24%
DN363	Manufacture of musical instruments	-5%	12%	18%
DN364	Manufacture of sports goods	14%	N.A.	N.A.
DN365	Manufacture of games and toys	N.A.	N.A.	N.A.
DN366	Miscellaneous manufacturing n.e.c.	N.A.	N.A.	N.A.
DN371	Recycling of metal waste and scrap	N.A.	N.A.	N.A.
DN372	Recycling of non-metal waste and scrap	N.A.	N.A.	N.A.

4.4.3 Concluding Remarks

Despite the shortcomings, in theory, the SBS data set could be very useful provided it would be possible to overcome the problems caused by the many confidential data by, perhaps moving a lower level of aggregation. Unfortunately, this does not seem possible in practice and, therefore, we did not pursue this avenue.

For information, we provide Annex 2 an overview of the availability of data on production in value in the SBS databank at various level of disaggregation.

4.5 The Prodcum Data

4.5.1 Description of the data set

Prodcum provides information on the products produced by the following industries: mining and quarrying, manufacturing, and electricity, gas and

water supply, i.e. Sections C, D and E of the Statistical Classification of Economic Activities in the European Community³² (Nace Rev. 1).

The basis of the survey is Council Regulation (EEC) No 3924/91 on the establishment of a Community survey of industrial production (Prodcom Regulation). In accordance with Article 2(2) of the above-mentioned Regulation, production is to be recorded according to the product headings of the Prodcom list. This is a potentially useful data set for analysing trends in production and apparent consumption of manufactured products at a high level of disaggregation. The industries covered by the Prodcom database are listed in Table 4.8.

Table 4.8: List of Industries Covered by Prodcom Database

Division 15:	Manufacture of food products and beverages
Division 16:	Manufacture of tobacco products
Division 17:	Manufacture of textiles
Division 18:	Manufacture of wearing apparel; dressing and dyeing of fur
Division 19:	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
Division 20:	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
Division 21:	Manufacture of pulp, paper and paper products
Division 22:	Publishing, printing and reproduction of recorded media
Division 24:	Manufacture of chemicals and chemical products
Division 25:	Manufacture of rubber and plastic products
Division 26:	Manufacture of other non-metallic mineral products
Division 27:	Manufacture of basic metals
Division 28:	Manufacture of fabricated metal products, except machinery and equipment
Division 29:	Manufacture of machinery and equipment n.e.c.
Division 30:	Manufacture of office machinery and computers
Division 31:	Manufacture of electrical machinery and apparatus n.e.c.
Division 32:	Manufacture of radio, television and communication equipment and apparatus
Division 33:	Manufacture of medical, precision and optical instruments, watches and clocks
Division 34:	Manufacture of motor vehicles, trailers and semi-trailers
Division 35:	Manufacture of other transport equipment
Division 36:	Manufacture of furniture; manufacturing n.e.c.

³² It does not include the products of coal and lignite mining, peat extraction, extraction of crude petroleum and natural gas, manufacture of coke and refined petroleum products, processing of nuclear fuel, and electricity, gas and water supply (Divisions 10, 11, 23, 40 and 41 of NACE Rev. 1), since they are already covered in a separate set of Community statistics; it does not include the products of Division 37 of NACE Rev.1 (Recycling). Specific studies are still being conducted into their statistical coverage.

Detailed information about this dataset is provided in Table 4.9. Some key facts to note are the following.

- q The data set covers about 5,000 products.
- q Apparent consumption data are available for 1993 to 1999 and production data are available from 1999 to 2000. For three major groups of products, data are also available quarterly: textiles (Nace 17), clothing (Nace 18) and chemicals (Nace 24).
- q The data set provides EEA-wide information.
- q The available variables are production, exports, imports and apparent consumption. Information is provided both at current and constant prices. Apparent consumption is derived residually as the differences between production and net exports, i.e.:

Apparent consumption = production (sold or for sale) + imports - exports.

Table 4.9: Data Source: Prodcorn Database

Table 4.9: Data Source: Prodcorn Database			
Evaluation criterion			
Data frequency	Annual		
Timeliness	The data are typically available 9 to 12 months after the end of the reference period		
Availability	1993-2000		
Variables covered	In current prices	In constant prices	Prices
Apparent consumption	√	√	
Total sales			
Exports	√	√	
Imports	√	√	
Production	√	√	
Gross output			
Gross value added			
Employment			
Investment			
Capacity utilisation rates			
Profits or profitability			
Level of aggregation	The information is collected for 5,000 different products, using the CPA Classification		
Sectors included	Sections C, D and E of Nace Rev.1		
Geographical coverage	European Union (individual countries and EU15) European Economic Area (Norway)		
Confidentiality issues	Due to confidentiality reasons, information is published for only about 60% of the products		

However, like the previous data sets, it also suffers from many problems.

- q It does not cover most of the services industries³³. This is a limitation as the new Multisectoral Framework on regional aid for large investment projects will cover the services sector as well.
- q EU/EEA-wide aggregates are often not available because of confidentiality reasons. Moreover, at the present time, Eurostat, does not compile the EU/EEA-wide apparent consumption data point if one of the

³³ It only covers industrial services, i.e. those included in the production process such as treatment, repairs and maintenance, and assembly work.

EU/EEA Member State's production data point is identified as confidential by the national reporting statistical agency.

- q The current mapping of the foreign trade data into the CPA classification used by Prodcom is viewed as less than fully satisfactory by Eurostat. However, Eurostat officials are working on this issue and the release of the 2001 data later in the fall of 2002 should be based on a revised and improved mapping.

Confidentiality is a major problem as illustrated by Table 4.10. The table reports the number of products for which data are published in a given year. EU-wide production data for 2128 products are presently published for the 1999 reference year and EU-wide apparent consumption data for 2000 products are published.

However, the number of EU-wide information published is much reduced for the reference year 1995. Only 483 and 465 EU-wide data points are published for production and apparent consumption respectively.

Moreover, the number of useable data points drops even more when the growth rate from 1995 to 1999 is computed as some of the unpublished data points vary from year to year. For example, the growth rate of production from 1995 to 1999 can be computed for only 304 products while information is published on 483 products in 1995 and 2128 in 1999.

Table 4.10: Number of published Prodcom data points for EU15 (value)

Number of data points for		
Year	Production	Apparent consumption
2000	836	0
1999	2128	2000
1998	2362	2208
1997	2480	0
1996	607	590
1995	483	465
Change from 1995 to 1999	304	295

4.5.2 Products experiencing a production or an apparent consumption decline in recent years

In the next set of Tables we list the products that, in the Prodcum database, post a decrease over the period 1995 to 1999 or 2000 for production and 1995 to 1999 for apparent consumption. For production, we report the list of products that post a drop in production over either the period 1995 to 1999 or 1995 to 2000 as many more data points are available over the period 1995 to 1999.

Two key points are worth noting:

1. There is very little overlap between the list of products posting a decline over the period 1996 to 2000 (Table 4.11) and the list of products showing a drop in production over the period 1995 to 1999 (Table 4.12);
2. The products posting an output decline over either of these two periods are scattered over the whole range of products and, with some exceptions, there is relatively little clustering of products within in a broader, lower level of disaggregation, product category. The key exceptions are the paper industry products (class 21.12) and the chemicals industry products (class 24.14).

We report the declines in apparent consumption observed over the period 1995 to 1999 only (Table 4.13) as no data on apparent consumption are presently publicly available for the reference year 2000. The point noted above of relatively little clustering of products posting an output decline applies as well to the apparent consumption data.

**Table 4.11: Products Posting Declines in Production
over the Period 1995-2000**

Code	Description (Prodcum nomenclature)	Percentage change
15.62.21.10	Glucose and glucose syrup (excl. with added flavouring or colouring matter)	-4%
15.62.22.11	Wheat starch	-20%
15.62.22.13	Maize (corn) starch	-9%
15.97.10.30	Malt; not roasted (excl. alcohol duty)	-6%
19.30.22.40	Sports footwear with rubber or plastic outer soles and textile uppers (incl. tennis shoes; basketball shoes; gym shoes; training shoes and the like)	-40%
19.30.23.50	Sports footwear with rubber; plastic or leather outer soles and leather uppers (excl. ski-boots; cross-country ski footwear and snowboard boots)	-12%
21.23.12.50	Letter cards; plain postcards and correspondence cards of paper or paperboard	-55%
24.12.11.30	Zinc oxyde; zinc peroxide	-9%
24.13.12.70	Sulphides of non-metals; commercial phosphorus trisulphide (excl. carbon)	-39%
24.13.41.10	Aluminates	-19%
24.14.24.59	Phenols or phenol-alcohol derivatives (excl. those containing only halogen substituents and their salts, those containing sulpho groups their salts and esters)	-19%
24.14.32.71	Acetic acid	-18%

**Table 4.11: Products Posting Declines in Production
over the Period 1995-2000**

Code	Description (Prodcom nomenclature)	Percentage change
24.14.33.83	Oxalic, azelaic, maleic, other, cyclanic, cylenic acids, salts	-4%
24.14.41.27	Acyclic polyamines their derivatives; and salts thereof (excl. ethylenediamine and its salts, hexamethylenediamine and its salts)	-19%
24.14.61.11	Methanal (formaldehyde)	-26%
24.51.20.90	Organic surface-active agents (excl. soap, anionic, cationic, non-ionic)	-1%
24.51.43.30	Polishes; creams and similar preparations; for footwear or leather (excl. artificial and prepared waxes)	-25%
24.51.43.70	Polishes and similar preparations; for coachwork (excl. artificial and prepared waxes, metal polishes)	-3%
24.61.11.50	Prepared explosives (excl. propellant powders)	-8%
24.61.13.00	Fireworks	-19%
24.66.41.00	Peptones and their derivatives; other protein substances and their derivatives; hide powder incl. glutelins and prolamins, globulins, glycinin, keratins, nucleo proteids, protein isolates	-8%
26.11.11.30	Wired sheets of cast or rolled glass whether or not coloured throughout the mass; opacified; flashed or having an absorbent or reflecting layer; but not otherwise worked	-47%
27.34.12.30	Stainless steel wire (excl. very fine sterile stainless wire used for surgical sutures)	-20%
27.35.12.00	Ferro-chromium	-19%
27.45.30.35	Unwrought cadmium, powders, waste and scrap (incl. cadmium zinc alloys) (excl. carbide)	-71%
29.71.26.30	Electric storage heating radiators	-4%
29.71.29.00	Electric heating resistors (excl. of carbon)	-3%
33.10.13.30	Dental drill engines, whether or not combined on a single base with other dental equipment	-3%
36.11.12.10	Seats convertible into beds (excl. garden seats or camping equipment)	-7%
36.63.50.50	Wigs, false bards, eyebrows... of human, animal hair, synthetic textile materials, n.e.c.	-11%

**Table 4.12: Products Posting Declines in Production
over the Period 1995-1999**

Product	Description (Prodcom nomenclature)	Percentage change
15.20.17.00	Flours; meals and pellets of fish or of crustaceans; molluscs or other aquatic invertebrates; unfit for human consumption	-2%
15.41.12.40	Crude sunflower-seed and safflower oil and their fractions (excl. chemically modified)	-25%
15.41.12.60	Crude rape; colza or mustard oil and their fractions (excl. chemically modified)	-4%
15.41.31.30	Oil-cake and other solid residues resulting from the extraction of soya-bean oil	-12%
15.41.31.70	Oil-cake and other solid residues resulting from the extraction of rape or colza seed fats or oils	-4%
15.42.13.30	Animal fats and oils and their fractions partly or wholly hydrogenated; inter-esterified; re-esterified or elaidinized; but not further prepared (incl. refined)	-37%
15.43.10.30	Margarine and reduced and low fat spreads (excl. liquid margarine)	-5%
15.43.10.50	Other edible preparations of fats and oils, incl. liquid margarine	0%
15.61.50.90	Bran; sharps and other residues from the sifting; milling or other working of cereals (excl. maize (corn), rice, wheat)	-52%
15.62.21.10	Glucose and glucose syrup (excl. with added flavouring or colouring matter)	-9%

**Table 4.12: Products Posting Declines in Production
over the Period 1995-1999**

Product	Description (Prodcom nomenclature)	Percentage change
15.62.22.13	Maize (corn) starch	-16%
15.62.30.00	Residues of starch manufacture and similar residues	-15%
15.83.20.00	Beet-pulp; bagasse and other sugar manufacturing waste (incl. defecation scum and filter press residues)	-5%
15.97.10.30	Malt; not roasted (excl. alcohol duty)	-7%
17.10.45.30	Yarn of wool or fine animal hair p.r.s.	-15%
17.10.45.57	Cotton yarn p.r.s. (excl. sewing thread, for hosiery)	-2%
17.10.55.70	Yarn of man-made staple fibres p.r.s. (excl. sewing thread)	-21%
17.52.11.55	Polyethylene or polypropylene binder or baler (agricultural) twines	-5%
18.24.43.33	Hats and headgear of fur skin	-39%
19.30.13.80	Footwear with wood; cork or other outer soles and leather uppers (excl. outer soles of rubber; plastics or leather)	-1%
19.30.22.40	Sports footwear with rubber or plastic outer soles and textile uppers (incl. tennis shoes; basketball shoes; gym shoes; training shoes and the like)	-31%
19.30.23.50	Sports footwear with rubber; plastic or leather outer soles and leather uppers (excl. ski-boots; cross-country ski footwear and snowboard boots)	-1%
20.20.14.75	Fibreboard of a density ≤ 0.35 g/cm ³ (excl. not mechanically worked or surface covered)	-45%
21.12.11.00	Newsprint in rolls or sheets	-2%
21.12.22.50	Uncoated; unbleached kraftliner in rolls or sheets (excl. for writing; printing or other graphic purposes, punch card stock and punch card tape paper)	-18%
21.12.23.35	Uncoated kraft paper/paperboard weighing between 150-225g/m ² (excl. kraftliner, sack kraft paper, for writing, printing or other graphic purposes, punch card stock and tape paper)	-11%
21.12.24.00	Uncoated semi-chemical fluting paper (corrugated medium); in rolls or sheets	-6%
21.12.51.30	Composite paper and paperboard in rolls or sheets; laminated with bitumen; tar or asphalt (excl. surface coated or impregnated)	-82%
21.12.51.50	Composite paper and paperboard in rolls or sheets (incl. strawpaper and paperboard, surface coated or impregnated, laminated with bitumen; tar or asphalt)	-24%
21.12.54.70	Paper/paperboard in rolls or sheets, coated on one/both sides with kaolin or other inorganic substances excl. of a kind used for any graphic purposes, multi-ply paper/paperboard	0%
21.22.12.30	Napkins and napkin liners for babies and similar sanitary articles of paper pulp, paper, cellulose wadding or webs of excl. toilet paper, sanitary towels, tampons and similar articles	-9%
24.12.24.70	Other colouring matter, preparations and luminophores	-2%
24.13.11.55	Silicon containing by weight < 99.99% of silicon	-7%
24.13.12.70	Sulphides of non-metals; commercial phosphorus trisulphide (excl. carbon)	-28%
24.14.12.25	Toluene	-4%
24.14.23.20	Propylene glycol (propane-1,2-diol)	-12%
24.14.24.59	Phenols or phenol-alcohol derivatives (excl. those containing only halogen substituents and their salts, those containing sulpho groups their salts and esters)	-23%
24.14.32.71	Acetic acid	-49%
24.14.33.83	Oxalic, azelaic, maleic, other, cyclohexanecarboxylic, cylenic acids, salts	-1%
24.14.43.70	Nitrile-function compounds (excl. acrylonitrile, 1-Cyanoguanidine (dicyandiamide))	-12%
24.14.61.11	Methanal (formaldehyde)	-41%
24.14.62.11	Acetone	-11%

**Table 4.12: Products Posting Declines in Production
over the Period 1995-1999**

Product	Description (Prodcom nomenclature)	Percentage change
24.16.10.50	Polyethylene having a specific gravity of ≥ 0.94 ; in primary forms	-11%
24.16.10.90	Polymers of ethylene; in primary forms (excl. polyethylene, ethylene-vinyl acetate copolymers)	-3%
24.16.20.35	Expansible polystyrene; in primary forms	-18%
24.16.30.10	Polyvinyl chloride; not mixed with any other substances; in primary forms	-10%
24.16.55.70	Melamine resins; in primary forms	-8%
24.16.56.50	Phenolic resins; in primary forms	-2%
24.41.20.60	Acyclic amides and their derivatives; and salts thereof (incl. acyclic carbamates)	-1%
24.51.43.30	Polishes; creams and similar preparations; for footwear or leather (excl. artificial and prepared waxes)	-23%
24.61.11.50	Prepared explosives (excl. propellant powders)	-10%
24.66.32.90	Additives for mineral oils or for other liquids used for the same purpose as mineral oils (incl. gasoline) (excl. anti-knock preparations, additives for lubricating oils)	0%
25.21.30.62	Plates..., of polyethylene terephthalate, not reinforced, etc.	-9%
25.21.30.63	Plates..., of unsaturated polyesters, not reinforced, etc.	-62%
25.21.30.79	Plates..., of other cellulose derivatives, not reinforced, etc, n.e.c.	-5%
25.24.26.00	Insulating fittings of plastic; for electrical machines; appliances or equipment (excl. electrical insulators)	-9%
26.11.11.30	Wired sheets of cast or rolled glass whether or not coloured throughout the mass; opacified; flashed or having an absorbent or reflecting layer; but not otherwise worked	-13%
26.22.10.30	Ceramic sinks... and other sanitary fixtures, of porcelain of china	-1%
26.26.12.90	Refractory bricks, blocks, tiles, etc, n.e.c.	-8%
27.22.10.53	Iron or steel welded; riveted or similarly closed tubes and pipes with internal and external circular cross-sections; external diameter > 406.4 mm	-17%
27.34.12.30	Stainless steel wire (excl. very fine sterile stainless wire used for surgical sutures)	-30%
27.35.12.00	Ferro-chromium	-31%
27.44.13.30	Unwrought unalloyed refined copper (excl. rolled, extruded or forged sintered products)	-37%
27.44.23.30	Copper wire, refined (transv. section > 6 mm), of copper alloy	-10%
27.45.30.35	Unwrought cadmium, powders, waste and scrap (incl. cadmium zinc alloys) (excl. carbide)	-69%
28.62.10.70	Other hand tools (excl. clasp knives) for agriculture, horticulture or forestry	-14%
28.75.27.82	Bells, gongs, etc, non-electric, of base metal	-3%
29.11.22.00	Hydraulic turbines and water wheels	-7%
29.22.14.45	Portal or pedestal jib cranes	0%
29.24.22.55	Automatic gravimetric filling machines	-9%
29.32.32.30	Turners, side delivery rakes, and tedders	-1%
29.53.22.30	Parts of machinery of 84.37	-10%
29.55.11.13	Machinery for making pulp of fibrous cellulosic material	-25%
29.71.26.30	Electric storage heating radiators	-4%
29.71.29.00	Electric heating resistors (excl. of carbon)	-4%
31.50.21.00	Portable electric lamps worked by dry batteries, accumulators or magnetos (excl. for cycles or motor vehicles)	-12%
32.10.11.00	Fixed power capacitors with a power handling capacity of > 0.5 kvar	-16%
32.10.12.77	Fixed metallised paper or plastic capacitors	-14%

**Table 4.12: Products Posting Declines in Production
over the Period 1995-1999**

Product	Description (Prodcom nomenclature)	Percentage change
32.20.11.50	Radio/tv transmission apparatus without reception apparatus	-1%
32.30.42.37	Multiple loudspeakers mounted in the same enclosure (incl. frames or cabinets mainly designed for mounting loudspeakers)	-1%
33.10.13.30	Dental drill engines, whether or not combined on a single base with other dental equipment	-15%
33.20.63.70	Electricity supply or production meters (incl. calibrated) (excl. voltmeters, ammeters, wattmeters and the like)	-12%
34.10.41.30	Goods vehicles with a diesel or semi-diesel engine, of a gross vehicle weight greater than 5 tonnes and < or equal to 20 tonnes incl. vans excl. dumpers, tractors	-25%
36.11.12.10	Seats convertible into beds (excl. garden seats or camping equipment)	-4%
36.50.41.00	Playing cards	-10%

**Table 4.13: Products Posting Declines in
Apparent Consumption over the Period 1995-1999**

Product	Description (Prodcom nomenclature)	Percentage change
15.11.18.00	Fresh; chilled or frozen meat of horses; asses; mules and hinnies	-11%
15.41.12.40	Crude sunflower-seed and safflower oil and their fractions (excl. chemically modified)	-22%
15.41.31.30	Oil-cake and other solid residues resulting from the extraction of soya-bean oil	0%
15.41.31.70	Oil-cake and other solid residues resulting from the extraction of rape or colza seed fats or oils	-4%
15.42.13.30	Animal fats and oils and their fractions partly or wholly hydrogenated; inter-esterified; re-esterified or elaidinized; but not further prepared (incl. refined)	-34%
15.43.10.30	Margarine and reduced and low fat spreads (excl. liquid margarine)	-2%
15.43.10.50	Other edible preparations of fats and oils, incl. liquid margarine	-2%
15.61.50.90	Bran; sharps and other residues from the sifting; milling or other working of cereals (excl. maize (corn), rice, wheat)	-130%
15.62.21.10	Glucose and glucose syrup (excl. with added flavouring or colouring matter)	-13%
15.62.22.13	Maize (corn) starch	-17%
15.62.30.00	Residues of starch manufacture and similar residues	-67%
15.83.20.00	Beet-pulp; bagasse and other sugar manufacturing waste (incl. defecation scum and filter press residues)	-6%
15.97.10.30	Malt; not roasted (excl. alcohol duty)	-11%
17.10.45.30	Yarn of wool or fine animal hair p.r.s.	-20%
17.10.45.57	Cotton yarn p.r.s. (excl. sewing thread, for hosiery)	-1%
17.10.55.70	Yarn of man-made staple fibres p.r.s. (excl. sewing thread)	-22%
17.52.11.55	Polyethylene or polypropylene binder or baler (agricultural) twines	-4%
18.24.12.10	Track-suits of knitted or crocheted textiles	-4%
19.30.22.40	Sports footwear with rubber or plastic outer soles and textile uppers (incl. tennis shoes; basketball shoes; gym shoes; training shoes and the like)	-59%
19.30.23.50	Sports footwear with rubber; plastic or leather outer soles and leather uppers (excl. ski-boots; cross-country ski footwear and snowboard boots)	-22%
20.20.14.15	Fibreboard of a density > 0.8 g/cm ³ (excl. not mechanically worked or surface covered)	-86%
20.20.14.75	Fibreboard of a density ≤ 0.35 g/cm ³ (excl. not mechanically worked or surface covered)	-25%
21.12.11.00	Newsprint in rolls or sheets	-3%
21.12.22.50	Uncoated; unbleached kraftliner in rolls or sheets (excl. for writing; printing or other graphic purposes, punch card stock and punch card tape paper)	-16%
21.12.24.00	Uncoated semi-chemical fluting paper (corrugated medium); in rolls or sheets	-17%
21.12.51.30	Composite paper and paperboard in rolls or sheets; laminated with bitumen; tar or asphalt (excl. surface coated or impregnated)	-84%
21.12.51.50	Composite paper and paperboard in rolls or sheets (incl. strawpaper and paperboard, surface coated or impregnated, laminated with bitumen; tar or asphalt)	-133%
21.12.52.30	Creped or crinkled kraft paper in rolls or sheets (excl. sack kraft paper)	-21%
21.22.12.30	Napkins and napkin liners for babies and similar sanitary articles of paper pulp, paper, cellulose wadding or webs of excl. toilet paper, sanitary towels, tampons and similar articles	-10%
24.12.24.70	Other colouring matter, preparations and luminophores	-14%
24.13.12.70	Sulphides of non-metals; commercial phosphorus trisulphide (excl. carbon)	-39%
24.13.31.57	Sulphates (excl. those of aluminium and barium)	-19%

**Table 4.13: Products Posting Declines in
Apparent Consumption over the Period 1995-1999**

Product	Description (Prodcom nomenclature)	Percentage change
24.13.32.40	Calcium hydrogenorthophosphate (dicalcium phosphate)	-2%
24.14.23.20	Propylene glycol (propane-1.2-diol)	-29%
24.14.24.59	Phenols or phenol-alcohol derivatives (excl. those containing only halogen substituents and their salts, those containing sulpho groups their salts and esters)	-28%
24.14.32.55	Salts and esters of formic acid	-1461%
24.14.32.71	Acetic acid	-52%
24.14.33.83	Oxalic, azelaic, maleic, other, cyclanic, cylenic acids, salts	-1%
24.14.34.73	Citric acid and its salts and esters	-14%
24.14.43.70	Nitrile-function compounds (excl. acrylonitrile, 1-Cyanoguanidine (dicyandiamide))	-22%
24.14.61.11	Methanal (formaldehyde)	-42%
24.14.62.11	Acetone	-31%
24.14.73.40	Naphthalene and other aromatic hydrocarbon mixtures (excl. benzole, toluole, xylole)	-37%
24.16.10.50	Polyethylene having a specific gravity of ≥ 0.94 ; in primary forms	-31%
24.16.10.90	Polymers of ethylene; in primary forms (excl. polyethylene, ethylene-vinyl acetate copolymers)	-5%
24.16.20.35	Expansible polystyrene; in primary forms	-21%
24.16.30.10	Polyvinyl chloride; not mixed with any other substances; in primary forms	-25%
24.16.51.50	Polymers of propylene or of other olefins; in primary forms (excl. polypropylene)	-93%
24.16.55.70	Melamine resins; in primary forms	-12%
24.16.56.50	Phenolic resins; in primary forms	-12%
24.16.58.50	Cellulose ethers and cellulose and its related derivatives; in primary forms (excl. cellulose acetates, cellulose nitrates)	-1%
24.16.58.70	Ion-exchangers based on synthetic or natural polymers	-238%
24.30.22.20	Prepared driers	-17%
24.30.22.60	Glaziers' putty; grafting putty; resin cements; caulking compound and non-refractory surfacing preparations for facades; indoor walls; floors; ceilings or the like	-7%
24.42.12.70	Medicaments containing adrenal cortical hormones but not antibiotics; for therapeutic or prophylactic uses; put up in measured doses or for retail sale	-26%
24.51.43.30	Polishes; creams and similar preparations; for footwear or leather (excl. artificial and prepared waxes)	-26%
24.61.11.50	Prepared explosives (excl. propellant powders)	-5%
24.63.10.75	Mixtures of odoriferous substances of a kind used in the food or drink industries	-88%
24.66.32.90	Additives for mineral oils or for other liquids used for the same purpose as mineral oils (incl. gasoline) (excl. anti-knock preparations, additives for lubricating oils)	-22%
25.21.10.90	Monofilament with any cross-sectional dimension > 1 mm; rods; sticks and profile shapes of plastics (excl. of polymers of ethylene, of polymers of vinyl chloride)	-10%
25.21.30.62	Plates..., of polyethylene terephthalate, not reinforced, etc.	-22%
25.21.30.63	Plates..., of unsaturated polyesters, not reinforced, etc.	-74%
25.21.30.79	Plates..., of other cellulose derivatives, not reinforced, etc, n.e.c.	-192%
25.24.26.00	Insulating fittings of plastic; for electrical machines; appliances or equipment (excl. electrical insulators)	-16%
26.11.11.30	Wired sheets of cast or rolled glass whether or not coloured throughout the mass; opacified; flashed or having an absorbent or reflecting layer; but not otherwise worked	-17%

**Table 4.13: Products Posting Declines in
Apparent Consumption over the Period 1995-1999**

Product	Description (Prodcom nomenclature)	Percentage change
26.14.12.50	Nonwoven glass fibre webs; felts; mattresses and boards	0%
26.26.12.90	Refractory bricks, blocks, tiles, etc, n.e.c.	-2%
27.22.10.53	Iron or steel welded; riveted or similarly closed tubes and pipes with internal and external circular cross-sections; external diameter > 406.4 mm	-46%
27.34.12.30	Stainless steel wire (excl. very fine sterile stainless wire used for surgical sutures)	-30%
27.35.12.00	Ferro-chromium	-30%
27.35.72.70	Forged bars and rods of alloy steel (excl. stainless steel, high speed steel, silico-manganese steel)	-10%
27.44.13.30	Unwrought unalloyed refined copper (excl. rolled, extruded or forged sintered products)	-33%
27.44.23.30	Copper wire, refined (transv. section > 6 mm), of copper alloy	-15%
27.45.30.25	Magnesium, articles thereof, powders, waste and scrap (excl. carbide)	-21%
27.45.30.35	Unwrought cadmium, powders, waste and scrap (incl. cadmium zinc alloys) (excl. carbide)	-74%
28.62.10.70	Other hand tools (excl. clasp knives) for agriculture, horticulture or forestry	-10%
28.73.11.30	Iron or steel stranded wire, ropes and cables (incl. stranded wires and wire ropes with or without attached fittings not electrically insulated) (excl. electrically insulated)	-7%
29.11.22.00	Hydraulic turbines and water wheels	-20%
29.24.22.55	Automatic gravimetric filling machines	-21%
29.32.32.30	Turners, side delivery rakes, and tedders	-7%
29.55.11.13	Machinery for making pulp of fibrous cellulosic material	0%
29.71.26.30	Electric storage heating radiators	-6%
32.10.11.00	Fixed power capacitors with a power handling capacity of > 0.5 kvar	-18%
32.10.12.77	Fixed metallised paper or plastic capacitors	-16%
32.20.11.50	Radio/tv transmission apparatus without reception apparatus	-1%
33.10.13.30	Dental drill engines, whether or not combined on a single base with other dental equipment	-2%
33.20.63.70	Electricity supply or production meters (incl. calibrated) (excl. voltmeters, ammeters, wattmeters and the like)	-10%
34.10.41.30	Goods vehicles with a diesel or semi-diesel engine, of a gross vehicle weight greater than 5 tonnes and < or equal to 20 tonnes incl. vans excl. dumpers, tractors	-25%
34.10.54.90	Special purpose motor vehicles, nes (eg breakdown lorries, etc)	-92%
36.11.12.10	Seats convertible into beds (excl. garden seats or camping equipment)	-3%
36.50.41.00	Playing cards	-13%

4.5.3 Concluding Remarks

The Prodcom data set in its present form is “plagued” by missing data, mostly for confidentiality reasons. However, it may be a potential source of information for the generation of the “List of sectors” in the future if it proved relatively easy to aggregate the confidential and non-confidential data so as to be able to make use of the full information contained in the databank. As this is not the case at the present time, we did not pursue this avenue.

4.6 The Short-Term Statistics

4.6.1 Description of the data set

The Eurostat Monthly and Quarterly Short-Term Statistics provide information, in index form, on production, turnover, new orders, labour inputs and producer prices. The legal basis of this dataset is Council Regulation No 1165/98 of May 19, 1998. The industry data are provided on the basis of NACE Rev. 1. Of particular interest is the fact that, for manufacturing (i.e., class D of NACE Rev.1), production data is to be provided at the 3-digit and 4-digit levels by those Member States whose total value added in manufacturing represents more than 5% of the European Community total.

Production data are provided in index form. They are a measure of the volume trend in value added at factor cost over a given reference period. According to the Eurostat description of the methodology of the industrial production index, value added at factor cost can be calculated from turnover (excluding VAT and other similar deductible taxes directly linked to turnover) plus capitalised production, plus other operating income plus or minus the changes in stocks, minus other taxes on products which are linked to turnover but not deductible, minus the duties and taxes linked to production. The data necessary for the compilation of such an index are, however, not available on a monthly basis. Therefore, in practice, suitable proxy value for the continuation of the indices are: continuation with gross production values (deflated), continuation with volumes, continuation with turnover (deflated), continuation with work input, continuation with raw material input and continuation with energy input.

The domestic output price index (or producer price index for the domestic market) shows the monthly price changes in the industrial sector. It is the actual ex-factory price that includes all duties and taxes on the goods and services invoiced by the unit but excludes VAT invoiced by the unit vis-à-vis its customers and similar deductible taxes directly linked to turnover.³⁴

The data are very timely as they are released by Eurostat only a few months after the end of the monthly reference period. At the present time the Short-Term Statistics cover only the EU area but, in the future, they will also cover EEA and accession candidate countries.

³⁴ It is important to note here that the production and price data are collected separately and that the volume index is not necessarily obtained through a deflation of some nominal output aggregate.

Data are provided for 100 manufacturing industries at the 3-digit level and 190 industries at the 4-digit level.

Table 4.14: Data Source: Short-term Statistics

Evaluation criterion	
Data frequency	Monthly, quarterly and annual
Timeliness	Data are available at T+2m, i.e. in principle 2 months after the end of the reference period
Availability back in time	Data for all manufactured products go back to 1995 and sometimes to 1990
Variables covered	Constant prices Prices
Production index	√
Turnover index	√
New orders index	√
Labour input index	√
Producer price index	√
Level of aggregation	Nace Rev. 1 classification, 3 and 4 digit classification for manufacturing
Industries included	100 3-digit manufacturing industries and 190 4-digit manufacturing industries
Geographical coverage	European Union historically European Economic Area –in the future EU Accession Countries –in the future
Confidentiality/missing data issues	Some – see Annex 1

The precise list of 3- and 4-digit manufacturing industries is provided in Tables 4.15 and 4.16. In Table 4.16, we also provide the weight of each 4-digit industry in total EU manufacturing in 1995, the base year for the current calculation of the production index. Of note is the fact that the relative contribution of each industry to total manufacturing output varies markedly. For example, the industry “Manufacture of other organic basic chemicals” accounts for 3.68% of total EU manufacturing in 1995 while the industry “Manufacture of plaster” accounts for only 0.03% of total EU manufacturing in 1995.

Table 4.15: European Business Trends - Monthly and Quarterly Short Term Statistics List of 3-digit manufacturing industries

DA151 Production, processing, preserving of meat, meat products
DA152 Processing and preserving of fish and fish products
DA153 Processing and preserving of fruit and vegetables
DA154 Manufacture of vegetable and animal oils and fats
DA155 Manufacture of dairy products
DA156 Manufacture of grain mill products, starches and starch products
DA157 Manufacture of prepared animal feeds
DA158 Manufacture of other food products
DA159 Manufacture of beverages
DB171 Preparation and spinning of textile fibres
DB172 Textile weaving
DB173 Finishing of textiles
DB174 Manufacture of made-up textile articles, except apparel
DB175 Manufacture of other textiles
DB176 Manufacture of knitted and crocheted fabrics
DB177 Manufacture of knitted and crocheted articles
*DB181 Manufacture of leather clothes
DB182 Manufacture of other wearing apparel and accessories
*DB183 Dressing and dyeing of fur; manufacture of articles of fur
DC191 Tanning and dressing of leather
*DC192 Manufacture of luggage, handbags and the like, saddler
DC193 Manufacture of footwear
DD201 Sawmilling and planing of wood, impregnation of wood
DD202 Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board, fibre board and other panels and boards
DD203 Manufacture of builders' carpentry and joinery
DD204 Manufacture of wooden containers
*DD205 Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
DE211 Manufacture of pulp, paper and paperboard
DE212 Manufacture of articles of paper and paperboard
DE221 Publishing
DE222 Printing and service activities related to printing
DE223 Reproduction of recorded media
DF231 Manufacture of coke oven products
DF232 Manufacture of refined petroleum products
*DF233 Processing of nuclear fuel
DG241 Manufacture of basic chemicals
DG242 Manufacture of pesticides and other agro-chemical products

Table 4.15: European Business Trends - Monthly and Quarterly Short Term Statistics List of 3-digit manufacturing industries

DG243	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
DG244	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
DG245	Manufacture of soap, detergents, cleaning, polishing
DG246	Manufacture of other chemical products
DG247	Manufacture of man-made fibres
DH251	Manufacture of rubber products
DH252	Manufacture of plastic products
DI26	Manufacture of other non-metallic mineral products
DI261	Manufacture of glass and glass products
DI262	Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products
DI263	Manufacture of ceramic tiles and flags
DI264	Manufacture of bricks, tiles and construction products
DI265	Manufacture of cement, lime and plaster
DI266	Manufacture of articles of concrete, plaster, cement
DI267	Cutting, shaping and finishing of stone
DI268	Manufacture of other non-metallic mineral products
DJ271	Manufacture of basic iron and steel and of ferro-alloys (ECSC)
DJ272	Manufacture of tubes
DJ273	Other first processing of iron and steel and production of non-ECSC ferro-alloys
DJ274	Manufacture of basic precious and non-ferrous metals
DJ275	Casting of metals
DJ281	Manufacture of structural metal products
DJ282	Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers
DJ283	Manufacture of steam generators, except central heating hot water boilers
DJ284	Forging, pressing, stamping and roll forming of metal; powder metallurgy
DJ285	Treatment and coating of metals; general mechanical engineering
DJ286	Manufacture of cutlery, tools and general hardware
DJ287	Manufacture of other fabricated metal products
DK291	Manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and cycle engines
DK292	Manufacture of other general purpose machinery
DK293	Manufacture of agricultural and forestry machinery
DK294	Manufacture of machine-tools
DK295	Manufacture of other special purpose machinery
DK296	Manufacture of weapons and ammunition
DK297	Manufacture of domestic appliances n.e.c.
DL311	Manufacture of electric motors, generators and transformers
DL312	Manufacture of electricity distribution and control apparatus

Table 4.15: European Business Trends - Monthly and Quarterly Short Term Statistics List of 3-digit manufacturing industries

DL313 Manufacture of insulated wire and cable
DL314 Manufacture of accumulators, primary cells and primary batteries
DL315 Manufacture of lighting equipment and electric lamps
DL316 Manufacture of electrical equipment n.e.c.
DL321 Manufacture of electronic valves and tubes and other electronic components
DL322 Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy
DL323 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
DL331 Manufacture of medical and surgical equipment and orthopaedic appliances
DL332 Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
DL333 Manufacture of industrial process control equipment
DL334 Manufacture of optical instruments, photographic equipment
DL335 Manufacture of watches and clocks
DM341 Manufacture of motor vehicles
DM342 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
DM343 Manufacture of parts, accessories for motor vehicles
DM351 Building and repairing of ships and boats
DM352 Manufacture of railway, tramway locomotives, rolling stock
DM353 Manufacture of aircraft and spacecraft
DM354 Manufacture of motorcycles and bicycles
DM355 Manufacture of other transport equipment n.e.c.
DN361 Manufacture of furniture
DN362 Manufacture of jewellery and related articles
DN363 Manufacture of musical instruments
*DN364 Manufacture of sports goods
DN365 Manufacture of games and toys
DN366 Miscellaneous manufacturing n.e.c.
*DN371 Recycling of metal waste and scrap
DN372 Recycling of non-metal waste and scrap

* = missing data

Table 4.16 European Business Trends - Monthly and Quarterly Short Term Statistics List of 4-digit manufacturing industries and share of total EU Manufacturing Production

4-digit industry	Share of 4-digit industry in total EU manufacturing in 1995 (in %)
DA1511 Production and preserving of meat	0.77
DA1512 Production and preserving of poultry meat	0.35
DA1513 Production of meat and poultry meat products	1.54
DA1531 Processing and preserving of potatoes	0.26
DA1532 Manufacture of fruit and vegetable juice	0.14
DA1533 Processing and preserving of fruit and vegetables n.e.c.	0.51
*DA1541 Manufacture of crude oils and fats	0.13
*DA1542 Manufacture of refined oils and fats	0.10
*DA1543 Manufacture of margarine and similar edible fats	0.12
DA1551 Operation of dairies and cheese making	1.58
*DA1552 Manufacture of ice cream	0.27
DA1561 Manufacture of grain mill products	0.41
*DA1562 Manufacture of starches and starch products	0.18
DA1571 Manufacture of prepared feeds for farm animals	0.48
DA1572 Manufacture of prepared pet foods	0.16
*DA1581 Manufacture of bread; manufacture of fresh pastry goods and cakes	2.10
*DA1582 Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes	0.61
DA1583 Manufacture of sugar	0.60
DA1584 Manufacture of cocoa; chocolate and sugar confectionery	0.96
DA1585 Manufacture of macaroni, noodles, couscous and similar farinaceous products	0.18
DA1586 Processing of tea and coffee	0.55
DA1587 Manufacture of condiments and seasonings	0.26
DA1588 Manufacture of homogenized food preparations and dietetic food	0.17
DA1589 Manufacture of other food products n.e.c.	0.61
*DA1591 Manufacture of distilled potable alcoholic beverages	0.43
*DA1592 Production of ethyl alcohol from fermented materials	0.06
*DA1593 Manufacture of wines	0.38
DA1594 Manufacture of cider and other fruit wines	0.04
*DA1595 Manufacture of other non-distilled fermented beverages	0.01
DA1596 Manufacture of beer	1.21
DA1597 Manufacture of malt	0.05
DA1598 Production of mineral waters and soft drinks	0.76

Table 4.16 European Business Trends - Monthly and Quarterly Short Term Statistics List of 4-digit manufacturing industries and share of total EU Manufacturing Production

*DB1711 Preparation and spinning of cotton-type fibres	0.24
DB1712 Preparation and spinning of woollen-type fibres	0.13
DB1713 Preparation and spinning of worsted-type fibres	0.13
*DB1714 Preparation and spinning of flax-type fibres	0.03
DB1715 Throwing and preparation of silk, including from noills, and throwing and texturing of synthetic or artificial filament yarns	0.08
*DB1716 Manufacture of sewing threads	0.07
DB1717 Preparation and spinning of other textile fibres	0.03
DB1721 Cotton-type weaving	0.43
DB1722 Woollen-type weaving	0.12
DB1723 Worsted-type weaving	0.10
DB1724 Silk-type weaving	0.16
DB1725 Other textile weaving	0.10
DB1751 Manufacture of carpets and rugs	0.29
*DB1752 Manufacture of cordage, rope, twine and netting	0.05
*DB1753 Manufacture of non-wovens and articles made from non-wovens, except apparel	0.09
DB1754 Manufacture of other textiles n.e.c.	0.49
DB1771 Manufacture of knitted and crocheted hosiery	0.26
DB1772 Manufacture of knitted and crocheted pullovers, cardigans and similar articles	0.41
*DB1821 Manufacture of workwear	0.10
DB1822 Manufacture of other outerwear	1.76
DB1823 Manufacture of underwear	0.56
DB1824 Manufacture of other wearing apparel and accessories n.e.c.	0.44
*DD2051 Manufacture of other products of wood	0.29
*DD2052 Manufacture of articles of cork, straw and plaiting materials	0.06
*DE2111 Manufacture of pulp	0.38
*DE2112 Manufacture of paper and paperboard	2.04
DE2121 Manufacture of corrugated paper and paperboard and of containers of paper and paperboard	1.36
DE2122 Manufacture of household and sanitary goods and of toilet requisites	0.38
DE2123 Manufacture of paper stationery	0.31
DE2124 Manufacture of wallpaper	0.06
*DE2125 Manufacture of other articles of paper and paperboard n.e.c.	0.28
*DE2211 Publishing of books	0.98
DE2212 Publishing of newspapers	1.66
*DE2213 Publishing of journals and periodicals	1.09
*DE2214 Publishing of sound recordings	0.13
*DE2215 Other publishing	0.09

Table 4.16 European Business Trends - Monthly and Quarterly Short Term Statistics List of 4-digit manufacturing industries and share of total EU Manufacturing Production

DE2221 Printing of newspapers	0.25
DE2222 Printing n.e.c.	3.32
*DE2223 Bookbinding and finishing	0.23
*DE2224 Composition and plate-making	0.36
*DE2225 Other activities related to printing	0.11
*DE2231 Reproduction of sound recording	0.14
*DE2232 Reproduction of video recording	0.03
*DE2233 Reproduction of computer media	0.09
*DG2411 Manufacture of industrial gases	0.33
DG2412 Manufacture of dyes and pigments	0.26
DG2413 Manufacture of other inorganic basic chemicals	0.62
DG2414 Manufacture of other organic basic chemicals	3.68
*DG2415 Manufacture of fertilizers and nitrogen compounds	0.29
DG2416 Manufacture of plastics in primary forms	1.50
DG2417 Manufacture of synthetic rubber in primary forms	0.09
DG2441 Manufacture of basic pharmaceutical products	0.53
DG2442 Manufacture of pharmaceutical preparations	3.63
DG2451 Manufacture of soap and detergents, cleaning and polishing preparations	0.89
DG2452 Manufacture of perfumes and toilet preparations	0.86
DG2461 Manufacture of explosives	0.10
DG2462 Manufacture of glues and gelatines	0.19
DG2463 Manufacture of essential oils	0.11
DG2464 Manufacture of photographic chemical material	0.31
*DG2465 Manufacture of prepared unrecorded media	0.05
DG2466 Manufacture of other chemical products n.e.c.	0.69
DH2511 Manufacture of rubber tyres and tubes	0.79
*DH2512 Retreading and rebuilding of rubber tyres	0.06
DH2513 Manufacture of other rubber products	0.88
DH2521 Manufacture of plastic plates, sheets, tubes and profiles	1.29
DH2522 Manufacture of plastic packing goods	0.95
DH2523 Manufacture of builders' ware of plastic	0.66
DH2524 Manufacture of other plastic products	1.99
*DI2611 Manufacture of flat glass	0.17
DI2612 Shaping and processing of flat glass	0.40
DI2613 Manufacture of hollow glass	0.63
DI2614 Manufacture of glass fibres	0.16
DI2615 Manufacture and processing of other glass, including technical glassware	0.22
DI2621 Manufacture of ceramic household and ornamental articles	0.28

Table 4.16 European Business Trends - Monthly and Quarterly Short Term Statistics List of 4-digit manufacturing industries and share of total EU Manufacturing Production

DI2622 Manufacture of ceramic sanitary fixtures	0.15
*DI2623 Manufacture of ceramic insulators and insulating fittings	0.03
DI2624 Manufacture of other technical ceramic products	0.04
*DI2625 Manufacture of other ceramic products	0.04
DI2626 Manufacture of refractory ceramic products	0.21
*DI2651 Manufacture of cement	0.69
DI2652 Manufacture of lime	0.07
DI2653 Manufacture of plaster	0.03
DI2661 Manufacture of concrete products for construction purposes	1.06
DI2662 Manufacture of plaster products for construction purposes	0.12
*DI2663 Manufacture of ready-mixed concrete	0.44
*DI2664 Manufacture of mortars	0.13
*DI2665 Manufacture of fibre cement	0.08
*DI2666 Manufacture of other articles of concrete, plaster and cement	0.06
DI2681 Production of abrasive products	0.16
DI2682 Manufacture of other non-metallic mineral products n.e.c.	0.33
DJ2721 Manufacture of cast iron tubes	0.13
DJ2722 Manufacture of steel tubes	0.56
*DJ2731 Cold drawing	0.06
DJ2732 Cold rolling of narrow strip	0.11
DJ2733 Cold forming or folding	0.06
*DJ2734 Wire drawing	0.19
*DJ2735 Other first processing of iron and steel n.e.c.; production of non-ECSC20 ferro-alloys	0.12
DJ2741 Precious metals production	0.06
DJ2742 Aluminium production	0.77
*DJ2743 Lead, zinc and tin production	0.11
DJ2744 Copper production	0.39
DJ2745 Other non-ferrous metal production	0.09
DJ2751 Casting of iron	0.43
DJ2752 Casting of steel	0.13
DJ2753 Casting of light metals	0.28
DJ2754 Casting of other non-ferrous metals	0.17
DJ2811 Manufacture of metal structures and parts of structures	1.87
DJ2812 Manufacture of builders' carpentry and joinery of metal	0.69
*DJ2821 Manufacture of tanks, reservoirs and containers of metal	0.26
DJ2822 Manufacture of central heating radiators and boilers	0.35
*DJ2851 Treatment and coating of metals	0.84
DJ2852 General mechanical engineering	1.89

Table 4.16 European Business Trends - Monthly and Quarterly Short Term Statistics List of 4-digit manufacturing industries and share of total EU Manufacturing Production

DJ2861 Manufacture of cutlery	0.13
DJ2862 Manufacture of tools	0.97
DJ2863 Manufacture of locks and hinges	0.61
DJ2871 Manufacture of steel drums and similar containers	0.09
DJ2872 Manufacture of light metal packaging	0.41
DJ2873 Manufacture of wire products	0.30
DJ2874 Manufacture of fasteners, screw machine products, chain and springs	0.56
DJ2875 Manufacture of other fabricated metal products n.e.c.	1.40
DK2911 Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	0.57
DK2912 Manufacture of pumps and compressors	1.00
DK2913 Manufacture of taps and valves	0.90
DK2914 Manufacture of bearings, gears, gearing and driving elements	0.93
DK2921 Manufacture of furnaces and furnace burners	0.20
DK2922 Manufacture of lifting and handling equipment	1.50
DK2923 Manufacture of non-domestic cooling and ventilation equipment	1.03
DK2924 Manufacture of other general purpose machinery n.e.c.	1.57
DK2931 Manufacture of agricultural tractors	0.22
*DK2932 Manufacture of other agricultural and forestry machinery	0.58
DK2951 Manufacture of machinery for metallurgy	0.24
DK2952 Manufacture of machinery for mining, quarrying and construction	0.76
DK2953 Manufacture of machinery for food, beverage and tobacco processing	0.56
DK2954 Manufacture of machinery for textile, apparel and leather production	0.62
DK2955 Manufacture of machinery for paper and paperboard production	0.30
DK2956 Manufacture of other special purpose machinery n.e.c.	1.73
DK2971 Manufacture of electric domestic appliances	1.17
DK2972 Manufacture of non-electric domestic appliances	0.16
*DL3001 Manufacture of office machinery	0.26
*DL3002 Manufacture of computers and other information processing equipment	1.79
DL3161 Manufacture of electrical equipment for engines and vehicles n.e.c.	0.66
DL3162 Manufacture of other electrical equipment n.e.c.	0.80
DM3511 Building and repairing of ships	0.82
*DM3512 Building and repairing of pleasure and sporting boats	0.10
DM3541 Manufacture of motorcycles	0.13
DM3542 Manufacture of bicycles	0.11
DM3543 Manufacture of invalid carriages	0.03
DN3611 Manufacture of chairs and seats	0.80
DN3612 Manufacture of other office and shop furniture	0.60
DN3613 Manufacture of other kitchen furniture	0.40

Table 4.16 European Business Trends - Monthly and Quarterly Short Term Statistics List of 4-digit manufacturing industries and share of total EU Manufacturing Production

DN3614 Manufacture of other furniture	1.30
DN3615 Manufacture of mattresses	0.16
*DN3621 Striking of coins and medals	0.04
*DN3622 Manufacture of jewellery and related articles n.e.c.	0.38
*DN3661 Manufacture of imitation jewellery	0.04
*DN3662 Manufacture of brooms and brushes	0.10
DN3663 Other manufacturing n.e.c.	0.50
Sum	100

* = missing data

Production data are publicly available for a large number of manufacturing industries since 1995, and the producer price index is generally available only since 1996 (see Table 4.17).

The data are available at a monthly, quarterly and annual frequency. In our analysis below, we will be using annual data as, in our view, these are less likely to be affected by one-off short-term shocks and are more likely to reflect the true state of the sector.

While some industry data are still missing after 1996, the number is very small if one focuses on the three-digit classification. For example, over a sample period going back to 1996, information on production is missing for only 8 manufacturing industries out of 100 manufacturing industries and information on producer prices is missing for only 10 manufacturing industries

Table 4.17 Missing production and price data in Short-Term Statistics

3-digit 102 industries		
	Production index ⁽¹⁾	Domestic producer price index ⁽²⁾
Data series available since		
1995	92	62
1996	94	92
Missing data series since 1996	8	10
4-digit 189 industries		
Data series available since		
1995	133	21
1996	133	152
Missing data series since 1996	56	38
(1) Annual production Index – data adjusted by working days		
(2) Annual domestic producer price index (annual average of quarterly data points)		

The industries for which data are missing even over the 1996 to 2001 period are listed with a * in Table 4.15 and 4.16

4.6.2 Growth dynamics

In table 4.17 and 4.18 we list the industries that post negative output growth (in volume and value³⁵) over the period 1996-2001. Of the 133 4-digit industries for which data are available, 46 post output declines over the period 1996-2001.

Among the 4-digit industries posting the largest declines are a number of sectors in the textile industry (Preparation and spinning of other textile fibres, -44%, woollen-type weaving, -35%, manufacture of underwear, -0.28%, manufacture of knitted and crocheted hosiery, -27%, worsted-type weaving -24%, manufacture of other outerwear, -24%, preparation and spinning of worsted-type fibres, -14%).

³⁵ Output in value is defined as the product of the production index and the domestic producer price index divided by 100. Thus, production in value is also an index with base 100 in 1995.

The group of other industries posting declines in excess of 10% include the following; manufacture of cast iron tubes (-22%), manufacture of ceramic household and ornamental articles (-21%), manufacture of wallpaper (-21%), manufacture of cutlery (-20%), manufacture of basic pharmaceutical products (-16%), other manufacturing nec (-15%), manufacture for paper and paperboard production (-15%), manufacture of bicycles (-14%), casting of non-ferrous metals (-14%), manufacture of sugar (-13%), building and repairing of ships (-12%), manufacture of machinery for textile, apparel and leather products (-11%), manufacture of steel drums and containers (-15%).

Table 4.16: 4-digit Manufacturing Industries Posting Declines in Output (volume and value) Over 1996-2001

Industry	Output in volume		Output in value
	Decline in output over 1996-2001	Number of years showing a decline in output	Change in output over 1996-2001
<i>DB1717</i> Preparation and spinning of other textile fibres	-0.44	4	n.a.
<i>DB1722</i> Woollen-type weaving	-0.35	4	-0.30
<i>DB1823</i> Manufacture of underwear	-0.28	5	-0.25
<i>DB1771</i> Manufacture of knitted and crocheted hosiery	-0.27	5	-0.23
<i>DB1723</i> Worsted-type weaving	-0.24	5	-0.18
<i>DB1822</i> Manufacture of other outerwear	-0.24	4	-0.20
<i>DJ2721</i> Manufacture of cast iron tubes	-0.22	4	-0.24
<i>DI2621</i> Manufacture of ceramic household and ornamental articles	-0.21	4	-0.13
<i>DE2124</i> Manufacture of wallpaper	-0.21	2	-0.22
<i>DJ2861</i> Manufacture of cutlery	-0.20	4	-0.08
<i>DG2441</i> Manufacture of basic pharmaceutical products	-0.16	4	n.a.

<i>DN3663</i> Other manufacturing n.e.c.	-0.15	4	-0.11
<i>DK2955</i> Manufacture of machinery for paper and paperboard production	-0.15	3	-0.07
<i>DM3542</i> Manufacture of bicycles	-0.14	5	-0.11
<i>DJ2754</i> Casting of other non-ferrous metals	-0.14	2	-0.11
<i>DB1713</i> Preparation and spinning of worsted-type fibres	-0.14	4	n.a.
<i>DA1583</i> Manufacture of sugar	-0.13	4	-0.15
<i>DM3511</i> Building and repairing of ships	-0.12	3	n.a.
<i>DK2954</i> Manufacture of machinery for textile, apparel and leather production	-0.11	4	-0.07
<i>DJ2871</i> Manufacture of steel drums and similar containers	-0.10	4	-0.11
<i>DB1824</i> Manufacture of other wearing apparel and accessories n.e.c.	-0.09	5	-0.02
<i>DG2417</i> Manufacture of synthetic rubber in primary forms	-0.09	4	n.a.
<i>DK2953</i> Manufacture of machinery for food, beverage and tobacco processing	-0.09	5	0.00
<i>DK2972</i> Manufacture of non-electric domestic appliances	-0.09	4	-0.04
<i>DA1531</i> Processing and preserving of potatoes	-0.08	4	-0.04
<i>DK2921</i> Manufacture of furnaces and furnace burners	-0.08	4	-0.02
<i>DI2653</i> Manufacture of plaster	-0.07	6	-0.04
<i>DB1751</i> Manufacture of carpets and rugs	-0.07	4	-0.03
<i>DK2931</i> Manufacture of agricultural tractors	-0.07	4	-0.04
<i>DE2123</i> Manufacture of paper stationery	-0.07	4	-0.04
<i>DI2626</i> Manufacture of refractory ceramic products	-0.06	4	-0.04
<i>DE2221</i> Printing of newspapers	-0.05	2	n.a.

<i>DA1596</i> Manufacture of beer	-0.05	4	0.03
<i>DJ2822</i> Manufacture of central heating radiators and boilers	-0.04	3	0.01
<i>DI2661</i> Manufacture of concrete products for construction purposes	-0.04	4	0.03
<i>DI2622</i> Manufacture of ceramic sanitary fixtures	-0.04	4	0.02
<i>DJ2752</i> Casting of steel	-0.04	3	-0.03
<i>DN3613</i> Manufacture of other kitchen furniture	-0.03	3	0.08
<i>DG2451</i> Manufacture of soap and detergents, cleaning and polishing preparations	-0.03	3	-0.03
<i>DH2523</i> Manufacture of builders' ware of plastic	-0.03	4	-0.01
<i>DA1584</i> Manufacture of cocoa; chocolate and sugar confectionery	-0.03	2	0.04
<i>DB1712</i> Preparation and spinning of woollen-type fibres	-0.03	4	0.06
<i>DI2652</i> Manufacture of lime	-0.02	4	0.08
<i>DJ2875</i> Manufacture of other fabricated metal products n.e.c.	-0.01	3	0.18
<i>DJ2873</i> Manufacture of wire products	-0.01	4	0.04

Table 4.17: 2- and 3 digit Manufacturing Industries Posting Declines in Output (volume and value) over 1996-2001

(Industries shown in italics are already covered by the 4-digit analysis)

Industry	Output in volume		Output in value
	Decline in output over 1996-2001	Number of years showing a decline in output	Change in output over 1996-2001
2-digit industry classification			
<i>DA16</i> Manufacture of Tobacco Product	-0.09	4	0.21
3-digit industry classification			
<i>DL335</i> Manufacture of watches and clocks	-0.25	5	-0.21
<i>DB182</i> Manufacture of other wearing apparel and accessories	-0.21	5	-0.16
<i>DN366</i> Miscellaneous manufacturing n.e.c.	-0.13	4	-0.07
<i>DC193</i> Manufacture of footwear	-0.12	4	-0.04
<i>DB176</i> Manufacture of knitted and crocheted fabrics	-0.12	3	-0.13
<i>DB173</i> Finishing of textiles	-0.11	3	n.a.
<i>DJ273</i> Other first processing of iron and steel and production of non-ECSC ferro-alloys	-0.10	2	-0.12
<i>DB171</i> Preparation and spinning of textile fibres	-0.10	3	-0.08
<i>DC191</i> Tanning and dressing of leather	-0.09	3	0.02
<i>DN363</i> Manufacture of musical instruments	-0.08	3	0.01
<i>DM351</i> Building and repairing of ships and boats	-0.08	4	n.a.
<i>DI262</i> Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products	-0.08	3	-0.02

<i>DB172 Textile weaving</i>	-0.08	4	-0.05
<i>DF231 Manufacture of coke oven products</i>	-0.07	4	-0.17
<i>DB177 Manufacture of knitted and crocheted articles</i>	-0.06	3	0.01
<i>DM352 Manufacture of railway, tramway locomotives, rolling stock</i>	-0.05	4	n.a.
<i>DJ283 Manufacture of steam generators, except central heating hot water boilers</i>	-0.05	4	-0.01
<i>DI267 Cutting, shaping and finishing of stone</i>	-0.04	1	0.05
<i>DJ282 Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers</i>	-0.04	3	0.01
<i>DB174 Manufacture of made-up textile articles, except apparel</i>	-0.02	2	0.02
<i>DF232 Manufacture of refined petroleum products</i>	-0.02	3	0.39
<i>DJ272 Manufacture of tubes</i>	-0.02	2	0.00
<i>DM354 Manufacture of motorcycles and bicycles</i>	-0.01	2	0.04
<i>DG247 Manufacture of man-made fibres</i>	-0.01	3	-0.05
<i>DA154 Manufacture of vegetable and animal oils and fats</i>	-0.01	3	-0.10

4.6.3 Concluding observations

The timeliness and richness of the STS data make this data source a prime candidate for use in the construction of a “List of sectors”. In our discussions with Eurostat officials, they were also of the opinion that this was the best data source as, according to them, of all the Eurostat data sources that we investigated, it was the only one providing consistent detailed information over time³⁶.

That being said, some issues need to be noted.

First, like any data, the STS data are subject to sampling bias and revisions. We understand that, at the present time, Eurostat does not undertake in-

³⁶ Abstracting from the more aggregated national accounts data source.

depth studies of potential sampling biases. However, Eurostat is presently preparing a report on the overall quality of the STS data. It will also cover the issue of frequency and magnitude of revisions. Once this report is publicly available, it will be possible to assess the practical implications of the revisions to the STS data for the proposed methodology for establishing a "List of sectors"

Second, it is also important to remember that 3- and 4-digit industry information is to be collected only by Member States whose total value-added for the Manufacturing Section represents more than 5% of the European Community total. This implies that some manufacturing activity may be under-reported, but the overall bias will likely be small as few EU Member States will fall under the threshold of 5%. Moreover, as long as the level of activity in a specific 3- or 4-d digit industry in a non-reporting Member State moves broadly in line with the level of activity of the same industry in reporting Member States, the estimated rate of change in production will be largely unaffected.

Third, in some instances, the 4-digit classification might be a too disaggregated level for the purpose of establishing a "List of Sectors", especially if the specific industry accounts for only a very small proportion of EU manufacturing output. In other instance, it might not be disaggregated enough if the 4-digit definition covers sub-sectors with clearly different growth prospects.

Fourth, the STS do not cover the services industries in great detail. As noted already in the case of the previously discussed Eurostat data sets, this is a major problem as the Multisectoral Framework applies also to the service industries.

Nevertheless, despite the shortcomings of the STS data, we believe that these are currently the best available. Therefore, we propose to use these data in our illustrative application of our proposed methodology and provide some guidance on how some of their shortcomings may be addressed in implementing the methodology.

4.7 A Note on Capacity Utilisation Rates

At the present time, Eurostat does not produce EU-wide capacity utilization rate statistics at a disaggregated industry level. Theoretically, it would be possible to construct industry specific economic indicators of capacity utilization by estimating potential or trend output in an industry and then calculate actual capacity utilisation by taking the ratio of actual to trend/potential output³⁷.

In practice, there exist three types of measures of capacity and capacity utilization.

2. The engineering or technical capacity utilisation indicators are typically based on the actual physical capacity of plants in a given industry (for example, maximum tonnage that can be produced).
3. The survey capacity utilization indicators are typically based on the survey respondents' views and perception of the utilization rate of the fixed assets (capital) in their industry.
4. As noted above, the economic capacity utilization indicators are based on the observed level of output relative to some estimate of potential or full capacity output. As we have noted in Section 3, firms may wish to maintain excess capacity for a number of reasons. The advantage of the economic capacity indicators relative to the engineering capacity indicators is that no assumption is made that firms necessarily aim to fully use all their physical capacity in normal operating conditions. In other words, in contrast to the engineering approach that typically equates potential output with full use of installed capacity, potential output in the economic approach is based on the maximum level of output that would be typically observed at the peak of the business cycle. In some industries, some excess physical capacity may still exist at the peak of the business cycle.

However, such capacity utilisation rates can only be constructed if the industry production data are available over a longer time period that includes a number of business cycles. As none of the Eurostat databanks provides such information at a detailed industry level, it will be impossible to construct meaningful capacity utilisation indicators at a disaggregated industry level.

³⁷ A number of techniques can be used to estimate potential output. The non-econometric methods typically involve a peak to peak or mid-cycle to mid-cycle estimation whereby potential output is set equal to the level that would prevail if output grew steadily from one output peak to another (or from the output level prevailing from one mid-point to another). Econometric methods involve the estimation of potential output, either using simple linear trend estimation or more sophisticated methods such as the Hodrick-Prescott method. Potential output can then be derived by renormalizing the estimated trend output series.

5 Survey of Pan-European Industry Federations

The national statistical agencies have been contacted to ascertain whether they produce relevant data (output, employment, capacity utilisation rates) that are not required by, and transmitted to, Eurostat. The responses received from the statistical agencies clearly indicate that there exist no additional sources of official data that are both consistent and available across all EU or EEA members States.

In addition to our discussions with Eurostat and contacts with EEA statistical agencies, we also conducted a survey of pan-European industry federations/associations, asking whether they collected EU/EEA wide statistics on their members' production, capacity and other industry variables. A total of 509 groups were contacted via postal questionnaire. We have received 37 responses, a return rate of 7%. Detailed information about the survey questionnaire and the responses we received is provided in Annex 3.

Of the 37 respondents, 18 organisations collect industry data on production (in value and/or in volume) at EU and/or EEA levels (Table 5.1). In contrast, only 6 associations out of the 37 collect any form of data on industry capacity (Table 5.2).

Table 5.1 Industry Associations Collecting Data on Industry Production

Industry Association	EU level	EEA level
Data on production in value		
European Chemical Industry Council	Yes	Yes
Confederation of National Associations of Tanners and Dressers of the EC	Yes	Yes
European Leather Association	Yes	Yes
Comité Européen des Constructeurs d'Instruments de Pesage	Yes	Yes
European Secretariat of Manufacturers of Light Metal Packaging	Yes	No
European Association of Aerospace Industries	Yes	No
Data on production in volume		
European Chemical Industry Council	Yes	Yes
Confederation of National Associations of Tanners and Dressers of the EC	Yes	Yes
European Leather Association	Yes	Yes

Table 5.1 Industry Associations Collecting Data on Industry Production

Industry Association	EU level	EEA level
European General Galvanizers Association	Yes	Yes
European Portable Battery Association	Yes	Yes
European Union of the Natural Gas Industry	Yes	Yes
International Rayon and Synthetic Fibres Committee	Yes	Yes
Fédération européenne du Verre d'Emballage	Yes	Yes
The European Cement Association	Yes	Yes
European Internet Service Providers Association	Yes	no
Union of Potato Starch Factories of the European Union	Yes	No
European Steel Tube Association	Yes	No
Association of European Automobile Manufacturers	Yes	No
European Natural Gas Vehicle Association	Yes	No
GAM - European Flour Milling Association	Yes	No

Table 5.2: Associations Collecting Data on Industry Capacity

Industry Association	EU level	EEA level
Data on industry capacity		
International Rayon and Synthetic Fibres Committee	Yes	Yes
The European Cement Association	Yes	Yes
European General Galvanizers Association	Yes	Yes
Union of Potato Starch Factories of the European Union	Yes	No
GAM - European Flour Milling Association	Yes	No
Data on industry capacity utilisation rate		
International Rayon and Synthetic Fibres Committee	Yes	Yes
The European Cement Association	Yes	Yes
Union of Potato Starch Factories of the European Union	Yes	No
Fédération européenne du Verre d'Emballage	Yes	No

6 Proposed Methodology

6.1 Introduction

In Section 3, we discussed the possibility of developing models for identifying sectors in decline that could be based either on one or two variables or on a richer multivariate structure. Unfortunately, data limitations proved to be more severe than originally expected. Therefore, the methodology we propose below is based on a simple, but transparent, model. The model is based on changes in the volume and value of production at the industry level using the data from the Short-Term Statistics produced by Eurostat.

As we noted earlier in Section 3, for a number of reasons it is preferable to focus on production rather than on apparent consumption. For example, if a sectoral decline is due to a loss of international competitiveness, apparent consumption will actually increase in volume terms and may increase in value terms, depending on the elasticity of demand.

Therefore, if the policy focus is on industry performance, the use of a decline in apparent consumption as an indicator of sectoral decline runs a very high risk of committing a “type II” error as an increase in apparent consumption can mask a decline in domestic production caused by increased foreign competition in the domestic market.

Conversely, a combination of weaker imports and stronger exports may result in a situation where apparent consumption declines while domestic production is robust as a result of strong exports. A classical example of such a case is the situation following a major negative terms of trade shock, such as a depreciation of the domestic currency vis-à-vis foreign currencies, which boosts exports while dampening domestic consumption and imports. In such a case, the use of apparent consumption as an indicator of the state of the industry would result in a “type I” error, wrongly classifying the industry as being in decline.

In contrast, domestic output in volume falls unambiguously in the case of a loss of international competitiveness. Moreover, as already noted previously, in the case of a decrease in domestic demand, output will fall in most plausible scenarios, even if supply shifts inward to some extent. Provided the overall demand impact dominates the supply impact, output and prices will fall. Therefore, we noted in Section 3 that it is useful to focus the analysis on output both in volume and value as this minimizes the risk of a “type I” error.

Obviously, in periods of high inflation, one would need to adjust the changes in the value of output for the general inflation trend. In a low inflation environment, this is much less of a concern as observed price movements reflect mainly real price changes.

6.2 Proposed Methodology

6.2.1 Conditions to be met

In short, our proposed approach defines sectors in decline as those industries that meet jointly the following three conditions:

- i. The industry shows an absolute decrease in production in volume over the reference period.
- ii. The industry posts a growth rate in production in value over the reference period below a threshold that is equal to the average EU-wide inflation rate. This is to take account of the overall drift in the general price level over the reference period. As an indicator of the general rate of growth of prices, we propose to use the price index of the EU-15 Gross Domestic Product at market prices as published by Eurostat.
- iii. The industry shows a steady pattern of decline of production in volume as evidenced by the fact that output in volume declined during “n” years over the reference period. This additional condition ensures that output in volume is really in trend decline in the industry and that the overall decline over the reference period does not simply capture one sharp drop in a given year.

6.2.2 Additional Filter

Once a complete list of industries meeting these three conditions is obtained, we propose to apply an additional filter that would take account of the capital intensity of the industry. This will contribute to ensure that the “List of sectors” will include only those sectors that are most likely to be the ones that would fall under the scope of the Multisectoral Framework.

Large investment projects are more likely to occur in larger-scale, capital intensive industries. Therefore, a filter based on the capital intensity of industries would help to identify those sectors that are most likely to be affected by the Multisectoral Framework.

We are not aware of any detailed data on the capital intensity of production at the EU-wide level or for individual Member States. Statistics Canada, however, publishes capital stock figures at a disaggregated industry level and this information provides some guidance on which EU industries are likely to be the most capital intensive, provided the production technologies do not differ substantially between the EU and Canada.

In Annex 4, we report the capital intensity, defined as the capital/labour ratio, at the 4-digit industry North American Industry Classification System and in Table 6.1 we list those Canadian industries that show above average

capital intensity. Each industry's capital/labour ratio was computed as an average over the period 1997-2001 to smooth out any special one-year effects and to take account of the cycle. We also report the output/capital ratio of each industry. While there is no perfect match between the two series, they nevertheless show a high level of correlation. Those industries that are the most capital intensive in terms of the capital/labour ratio are also the industries that tend to post among the lowest output/capital ratios.

In our illustrative application of the methodology, we will only include sectors on the List of sectors that by Canadian standards are more capital intensive than manufacturing on average. This threshold is used purely for illustrative purposes and can be varied as desired.

Table 6-1: Capital/employment and Output/capital Ratios of Canadian Industries

Industry	Capital/employment ratio	GDP/capital ratio
Basic chemical manufacturing	456053.28	0.46
Pulp, Paper and Paperboard Mills	389615.09	0.33
Alumina and aluminum production and processing	369213.57	0.40
Petroleum and coal products manufacturing	330397.91	0.24
Non-ferrous metal (except aluminum) production and processing	287340.58	0.35
Paper manufacturing	280005.16	0.38
Resin, synthetic rubber, and artificial and synthetic fibres and filaments	250346.36	1.35
Pesticide, fertilizer and other agricultural chemical manufacturing	234035.36	1.06
Motor vehicle manufacturing	233187.03	0.57
Primary metal manufacturing	211632.85	0.50
Iron and steel mills and ferro-alloy manufacturing	191791.70	0.61
Chemical manufacturing	170537.20	0.85
Veneer, plywood and engineered wood product manufacturing	152643.27	0.45
Fibre, yarn and thread mills	127264.84	0.20
Grain and oilseed milling	119913.35	1.32
Pharmaceutical and medicine manufacturing	110504.34	0.93
Foundries	96882.90	0.74
Steel product manufacturing from purchased steel	96301.49	0.90
Transportation equipment manufacturing	96159.50	1.13
Tobacco manufacturing	92463.38	3.03
Lime and gypsum product manufacturing	89518.12	1.22
Other chemical product manufacturing	82349.16	1.20
Communications equipment manufacturing	81066.20	2.57
Sugar and confectionery product manufacturing	78365.70	1.40

Manufacturing (total)	76948.47	1.03
Cement and concrete product manufacturing	76941.60	0.98

6.3 A Note On The Level Of Industry Disaggregation And Potential Production Substitutability

As noted earlier in Section 4, the 4-digit industries vary substantially in terms of their contribution of overall EU-wide manufacturing. Moreover, in some instances the borderline between two industries appears to be very narrow and it is conceivable that a plant's machinery and equipment capital could easily be adapted to switch production from a type of product classified as industry y output to a different type of product classified as industry x output. Output substitutability is a real issue that could bias the whole approach if, within a broader sector, firms can easily move from one to another industry.

Ideally, the combined output of these two industries would need to be considered in the application of the proposed methodology as a decline in one type of production may be more than offset by buoyant production of another type of product. If this were the case, it would be wrong to label the sector as being in decline.

Unfortunately, at the present time, it is impossible to determine for each 4-digit industry to what extent equipment and structures used in that industry could easily be shifted to production that would be classified in a different industry.

Two avenues could be explored to shed further light on this potential problem. First, advice from industry experts could be sought. Second, the primary statistical information collected by Member States could be checked by officials from the national statistical agencies to determine to what extent the industry classification of individual plants or firms is changing over time. As the latter exercise would be very time consuming and resource-intensive, it would need to be targeted at those industries most likely to exhibit such a pattern.

6.4 Details Of Proposed Methodology

6.4.1 Data to be used in establishing the List of sectors

On the basis of our review of the various possible data sources and their pros and cons, we recommend to use the Short Term Statistics from Eurostat to establish the List of sectors.

More precisely, we recommend using:

1. For production in volume, the Annual production index – adjusted by working days (linda01a in ind_prod in ebt_ind, theme 4, in NewCronos);
2. For the price of production, the annual average of the quarterly domestic producer price index (l07qprin in ind_pric in ebt_ind, theme 4, in NewCronos);
3. Production in value defined as the product of production in volume and the price of production.

6.4.2 Level of aggregation at which the analysis should be undertaken

As noted before, production and price information is provided in the Short Term Statistics at both the 3-digit and 4-digit level of aggregation.

Because 3-digit groupings may include 4-digit industries that exhibit different growth patterns, we recommend to perform the analysis at the 4-digit industry level of aggregation in cases where such information is available and to use the 3-digit level of aggregation only in the cases where no finer level of disaggregation exists in the databank³⁸.

The table overleaf provides the list of 2- and 3-digit industries that will need to be included in the analysis to cover the full universe of manufacturing in the Short-Term Statistics databank.

In total, in addition to the 133 4-digit industries for which data are available, only one 2-digit industry needs to be examined separately, namely Manufacture of tobacco products, and 45 3-digit manufacturing industries need to be assessed.

As we have already noted in Section 4, the contribution to EU-wide manufacturing of the individual 4-digit industries varies markedly across industries. Therefore, one may wish to include on the “List of sector” only those industries that count for a significant share of total EU manufacturing.

³⁸ In one case (i.e., manufacture of tobacco products), it is necessary to perform the analysis at the 2-digit level as no higher level of disaggregation is provided in the databank.

In our illustrative application of the methodology, we simply provide information on the weight of each industry in total EU manufacturing.

We will also discuss how, if so desired, the analysis could be extended to an even more disaggregated level for a limited number of critical sectors (i.e., sectors with high capital intensity, large investment size and prone to subsidy auctions).

Table 6-2: 2- And 3-Digit Industries To Be Used In Addition to 4-digit Industries In The Methodology For Establishing The List of sectors

2-digit classification

DA16 Manufacture of tobacco products

3 digit industry classification for which no data on a 4-digit industry classification are provided

DA152 Processing and preserving of fish and fish products

DB173 Finishing of textiles

DB174 Manufacture of made-up textile articles, except apparel

DB176 Manufacture of knitted and crocheted fabrics

[DB181 Manufacture of leather clothes – data missing]

[DB183 Dressing and dyeing of fur; manufacture of articles of fur- data missing]

DC191 Tanning and dressing of leather

[DC192 Manufacture of luggage, handbags and the like, saddler – data missing]

DC193 Manufacture of footwear

DD201 Sawmilling and planing of wood, impregnation of wood

DD202 Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board, fibre board and other panels and boards

DD203 Manufacture of builders' carpentry and joinery

DD204 Manufacture of wooden containers

DF231 Manufacture of coke oven products

DF232 Manufacture of refined petroleum products

[DF233 Processing of nuclear fuel – data missing]

DG247 Manufacture of man-made fibres

DI263 Manufacture of ceramic tiles and flags

DI264 Manufacture of bricks, tiles and construction products

DI267 Cutting, shaping and finishing of stone

DJ271 Manufacture of basic iron and steel and of ferro-alloys (ECSC)

DJ283 Manufacture of steam generators, except central heating hot water boilers

DJ284 Forging, pressing, stamping and roll forming of metal; powder metallurgy

DK294 Manufacture of machine-tools

DK296 Manufacture of weapons and ammunition

DL311 Manufacture of electric motors, generators and transformers

DL312 Manufacture of electricity distribution and control apparatus

DL313 Manufacture of insulated wire and cable

DL314 Manufacture of accumulators, primary cells and primary batteries

DL315 Manufacture of lighting equipment and electric lamps

DL321 Manufacture of electronic valves and tubes and other electronic components

DL322 Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy

DL323 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods

DL331 Manufacture of medical and surgical equipment and orthopaedic appliances

DL332 Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment

DL333 Manufacture of industrial process control equipment

DL334 Manufacture of optical instruments, photographic equipment

DL335 Manufacture of watches and clocks

DM341 Manufacture of motor vehicles

DM342 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers

DM343 Manufacture of parts, accessories for motor vehicles

DM352 Manufacture of railway, tramway locomotives, rolling stock

DM353 Manufacture of aircraft and spacecraft

DM355 Manufacture of other transport equipment n.e.c.

DN361 Manufacture of furniture

[DN362 Manufacture of jewellery and related articles – data missing]

DN363 Manufacture of musical instruments

[DN364 Manufacture of sports goods – data missing]

DN365 Manufacture of games and toys

[DN371 Recycling of metal waste and scrap – data missing]

DN372 Recycling of non-metal waste and scrap

6.4.3 Time period over which the analysis should be undertaken

Ideally, it would be desirable to perform the analysis, at a minimum, over a whole business cycle. While this raises the problem of dating the industry-specific business cycle, such an approach has the key advantage of reducing the risk of identifying as structural decline a simple cyclical decline.

However, severe data limitations prevent the undertaking of such longer-term analysis over the full business cycle as all the Eurostat data sets, that we have reviewed for this project, provide consistent information only from 1995 or 1996 onwards.

As the price information required for our analysis is widely available only from 1996 onwards, we recommend focusing, at the present time, the analysis on the 6-year reference period of 1996 to 2001.

Thus, we recommend calculating over 1996 to 2001 the output growth (in volume and value) rates required by our proposed approach for establishing the first List of sectors.

Such a period coincides with the length of the 6-year reference period currently used by the Commission in regional State aid assessments.

Looking ahead, as more data become available, we would recommend to adopt a rolling window approach whereby the changes in output (volume

and value) would be calculated over a fixed period of six years but the reference period over which they are calculated gradually changes as more information becomes available.

Thus, for example, later in 2003, it will be possible to derive the 5-year rate of change of output in volume and value over the period 1997-2002.

Consistent information across two sample periods would increase the robustness of the results and the confidence that sectors identified as being in decline are truly in decline.

6.4.4 How to distinguish a structural decline from a cyclical downturn

As already noted earlier, undertaking a growth analysis over a limited period of five years runs the risk of mistakenly identifying a cyclical downturn as a structural decline.

To reduce the risk of committing such an error, we recommend that, in addition to having to meet the joint test of posting declines in output in volume and value over the reference period, an industry will also need to exhibit a systematic pattern of decline in output before it can be labelled as being structurally in decline.

To avoid introducing too many complexities in the methodology, we propose to apply this additional condition only to changes in output in volume.

At issue then is the choice of the number of years, n , over which output in volume is required to show declines. To avoid confusing a cyclical movement with a structural downward trend, we recommend that " n " be set at a number that, at least, exceeds the number of years during which aggregate output declines over the reference period. Obviously, the higher the " n " threshold, the more restrictive this criterion becomes.

On balance, and after having examined the implications of different thresholds (see below), we recommend using two years as the minimum number of years during which output has to decline over the five-year reference period.

6.5 Implementation of the proposed methodology

Our proposed approach is relatively simple to implement. It involves the following steps:

- Step 1 involves computing the growth rate of output (in volume or constant prices) over the reference period.
- Step 2 involves identifying the industries in which output (in volume) has fallen over the reference period.

- Step 3 involves the computation of the growth rate of output (in value) for those industries in which output in volume has fallen. In a few instances, no price information is available. For the purpose of drawing up the “List of sectors” we propose to assume that output in value is likely to have dropped in all industries posting declines of output in volume greater than the economy-wide inflation rate over the reference period. Step 4 involves checking whether, in those industries, output (in value) has grown by less than 11.8% (i.e. less than the general inflation rate³⁹) over the reference period.
- Step 5, involves checking whether output (in volume) is declining for at least 2 years in industries meeting the conditions of step 4.
- Step 6, involves the application of the capital intensity filter.

6.6 Illustrative application of the methodology

6.6.1 Changes in output in volume and value

The proposed methodology for establishing the “List of sectors” has been applied over the period 1996-2001 and below we report the key results

The tables overleaf are identical to those presented earlier in Section 4. They report the changes in output (in volume and value) for all industries posting a decline in output (in volume) over the period 1996-2001, and the number of years during output (in volume) has declined⁴⁰. These calculations have been performed at both the 4- digit level (Table 6.2) and 3-digit level (Table 6.3)

Altogether, there are 45 manufacturing industries at the 4-digit classification showing decreases in output (in volume) over the period 1996-2001. Of those 45 industries, 31 post decreases of more than 5% and 20 industries show declines of 10% or more.

Among the 45 4-digit industries that recorded a decline in output (in volume) over the period 1996-2001:

- Only one (Manufacture of other fabricated metals n.e.c.) posted an increase in output in value that exceeds the general increase in prices of 11.8%;
- Twenty-eight industries saw their output in value decline and nine experienced no change in output in value or an increase that is smaller than the general price increase.

³⁹ According to Eurostat, the price index of EU-15 GDP (at market prices) stood at 103.36 in 1996 and 115.51 in 2001, yielding an increase of 11.76% over this period.

⁴⁰ More detailed information is provided for each industry over 1995 –2001 on an annual basis in Annex 1.

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- No price data are available for 5 industries. As noted previously, in the case of industries for which no price data are available we will assume that output in value has fallen as well whenever output in volume shows a decline of more than 11.8%⁴¹.

The application of our proposed criteria -- drop of output (in volume) of over the reference period, rate of growth in output in value lower than the general upward drift in prices and at least two years of decline in output in volume over the reference period) yields a list of 44 industries (at the 4-digit classification).

The results of a similar analysis at the 2- and 3-digit level are reported in Table 6.3. 25 industries at the 3-digit classification level show declines in output in volume over the reference period and none post increases in output in value greater than 11.8%.

However, a number of these industries have already been covered by the analysis at the 4-digit level, and only 14 new industries are to be added to the previous list.

This, in total, our methodology shows that, in total, 59 industries meet the proposed selection criteria over the period 1996-2001. Next, we turn to the use of a capital intensity filter to slim down this list.

⁴¹ This implicitly assumes that the general price trend is a good proxy for the sectoral price trend in the absence of more precise information.

Table 6-3: 4-digit Manufacturing Industries Posting Declines in Output (volume and value) over 1996-2001

Industry	Output in volume		Output in value
	Decline in output over 1996-2001	Number of years showing a decline in output	Change in output over 1996-2001
<i>DB1717</i> Preparation and spinning of other textile fibres	-0.44	4	n.a.
<i>DB1722</i> Woollen-type weaving	-0.35	4	-0.30
<i>DB1823</i> Manufacture of underwear	-0.28	5	-0.25
<i>DB1771</i> Manufacture of knitted and crocheted hosiery	-0.27	5	-0.23
<i>DB1723</i> Worsted-type weaving	-0.24	5	-0.18
<i>DB1822</i> Manufacture of other outerwear	-0.24	4	-0.20
<i>DJ2721</i> Manufacture of cast iron tubes	-0.22	4	-0.24
<i>DI2621</i> Manufacture of ceramic household and ornamental articles	-0.21	4	-0.13
<i>DE2124</i> Manufacture of wallpaper	-0.21	2	-0.22
<i>DJ2861</i> Manufacture of cutlery	-0.20	4	-0.08
<i>DG2441</i> Manufacture of basic pharmaceutical products	-0.16	4	n.a.
<i>DN3663</i> Other manufacturing n.e.c.	-0.15	4	-0.11
<i>DK2955</i> Manufacture of machinery for paper and paperboard production	-0.15	3	-0.07
<i>DM3542</i> Manufacture of bicycles	-0.14	5	-0.11
<i>DJ2754</i> Casting of other non-ferrous metals	-0.14	2	-0.11
<i>DB1713</i> Preparation and spinning of worsted-type fibres	-0.14	4	n.a.

<i>DA1583</i> Manufacture of sugar	-0.13	4	-0.15
<i>DM3511</i> Building and repairing of ships	-0.12	3	n.a.
<i>DK2954</i> Manufacture of machinery for textile, apparel and leather production	-0.11	4	-0.07
<i>DJ2871</i> Manufacture of steel drums and similar containers	-0.10	4	-0.11
<i>DB1824</i> Manufacture of other wearing apparel and accessories n.e.c.	-0.09	5	-0.02
<i>DG2417</i> Manufacture of synthetic rubber in primary forms	-0.09	4	n.a.
<i>DK2953</i> Manufacture of machinery for food, beverage and tobacco processing	-0.09	5	0.00
<i>DK2972</i> Manufacture of non-electric domestic appliances	-0.09	4	-0.04
<i>DA1531</i> Processing and preserving of potatoes	-0.08	4	-0.04
<i>DK2921</i> Manufacture of furnaces and furnace burners	-0.08	4	-0.02
<i>DI2653</i> Manufacture of plaster	-0.07	6	-0.04
<i>DB1751</i> Manufacture of carpets and rugs	-0.07	4	-0.03
<i>DK2931</i> Manufacture of agricultural tractors	-0.07	4	-0.04
<i>DE2123</i> Manufacture of paper stationery	-0.07	4	-0.04
<i>DI2626</i> Manufacture of refractory ceramic products	-0.06	4	-0.04
<i>DE2221</i> Printing of newspapers	-0.05	2	n.a.
<i>DA1596</i> Manufacture of beer	-0.05	4	0.03
<i>DJ2822</i> Manufacture of central heating radiators and boilers	-0.04	3	0.01
<i>DI2661</i> Manufacture of concrete products for construction purposes	-0.04	4	0.03
<i>DI2622</i> Manufacture of ceramic sanitary fixtures	-0.04	4	0.02
<i>DJ2752</i> Casting of steel	-0.04	3	-0.03

<i>DN3613</i> Manufacture of other kitchen furniture	-0.03	3	0.08
<i>DG2451</i> Manufacture of soap and detergents, cleaning and polishing preparations	-0.03	3	-0.03
<i>DH2523</i> Manufacture of builders' ware of plastic	-0.03	4	-0.01
<i>DA1584</i> Manufacture of cocoa; chocolate and sugar confectionery	-0.03	2	0.04
<i>DB1712</i> Preparation and spinning of woollen-type fibres	-0.03	4	0.06
<i>DI2652</i> Manufacture of lime	-0.02	4	0.08
<i>DJ2875</i> Manufacture of other fabricated metal products n.e.c.	-0.01	3	0.18
<i>DJ2873</i> Manufacture of wire products	-0.01	4	0.04

Table 6-4: 2 and 3 digit Manufacturing Industries Posting Declines in Output (volume and value) over 1996-2001

(Industries in italics are already covered by the 4-digit analysis)

Industry	Output in volume		Output in value
	Decline in output over 1996-2001	Number of years showing a decline in output	Change in output over 1996-2001
2-digit industry classification			
<i>DA16</i> Manufacture of Tobacco Product	-0.09	4	0.21
3-digit industry classification			
<i>DL335</i> Manufacture of watches and clocks	-0.25	5	-0.21
<i>DB182</i> Manufacture of other wearing apparel and accessories	-0.21	5	-0.16
<i>DN366</i> Miscellaneous manufacturing n.e.c.	-0.13	4	-0.07
<i>DC193</i> Manufacture of footwear	-0.12	4	-0.04
<i>DB176</i> Manufacture of knitted and crocheted fabrics	-0.12	3	-0.13
<i>DB173</i> Finishing of textiles	-0.11	3	n.a.
<i>DJ273</i> Other first processing of iron and steel and production of non-ECSC ferro-alloys	-0.10	2	-0.12
<i>DB171</i> Preparation and spinning of textile fibres	-0.10	3	-0.08
<i>DC191</i> Tanning and dressing of leather	-0.09	3	0.02
<i>DN363</i> Manufacture of musical instruments	-0.08	3	0.01
<i>DM351</i> Building and repairing of ships and boats	-0.08	4	n.a.
<i>DI262</i> Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products	-0.08	3	-0.02

<i>DB172 Textile weaving</i>	-0.08	4	-0.05
<i>DF231 Manufacture of coke oven products</i>	-0.07	4	-0.17
<i>DB177 Manufacture of knitted and crocheted articles</i>	-0.06	3	0.01
<i>DM352 Manufacture of railway, tramway locomotives, rolling stock</i>	-0.05	4	n.a.
<i>DJ283 Manufacture of steam generators, except central heating hot water boilers</i>	-0.05	4	-0.01
<i>DI267 Cutting, shaping and finishing of stone</i>	-0.04	1	0.05
<i>DJ282 Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers</i>	-0.04	3	0.01
<i>DB174 Manufacture of made-up textile articles, except apparel</i>	-0.02	2	0.02
<i>DF232 Manufacture of refined petroleum products</i>	-0.02	3	0.39
<i>DJ272 Manufacture of tubes</i>	-0.02	2	0.00
<i>DM354 Manufacture of motorcycles and bicycles</i>	-0.01	2	0.04
<i>DG247 Manufacture of man-made fibres</i>	-0.01	3	-0.05
<i>DA154 Manufacture of vegetable and animal oils and fats</i>	-0.01	3	-0.10

6.6.2 A Potential List of Sectors

In Table 6.4, we combine the information from the previous tables with information on the relative importance the specific industry in total EU manufacturing and its likely capital intensity. As noted above, 45 industries meet the basic selection criteria.

The use of a capital intensity filter will help to narrow significantly this list. For example, if one uses the Canadian capital intensity data as a proxy of the capital intensity of EU industries and assumes that only those industries that show above average capital intensity should be included on the list, then out the 45 potential candidate industries, only 13 industries would qualify for the list. These are the ones with a “yes” in the column “Does the industry show above average capital intensity” in Table 6.4

Table 6.4: List of Industries Meeting the Three Identification Criterion

4-digit Industries	Share of industry in EU-wide manufacturing in 1995	Does industry show above average capital intensity
<i>DB1713</i> Preparation and spinning of other textile fibres	0.03	
<i>DB1722</i> Woollen-type weaving	0.12	
<i>DB1823</i> Manufacture of underwear	0.56	
<i>DB1771</i> Manufacture of knitted and crocheted hosiery	0.26	
<i>DB1723</i> Worsted-type weaving	0.10	
<i>DB1822</i> Manufacture of other outerwear	1.76	
<i>DJ2721</i> Manufacture of cast iron tubes	0.13	Yes
<i>DI2621</i> Manufacture of ceramic household and ornamental articles	0.28	
<i>DE2124</i> Manufacture of wallpaper	0.06	
<i>DJ2861</i> Manufacture of cutlery	0.13	
<i>DG2441</i> Manufacture of basic pharmaceutical products	0.53	Yes
<i>DN3663</i> Other manufacturing n.e.c.	0.50	
<i>DK2955</i> Manufacture of machinery for paper and paperboard production	0.30	
<i>DM3542</i> Manufacture of bicycles	0.11	
<i>DJ2754</i> Casting of other non-ferrous metals	0.17	Yes
<i>DB1713</i> Preparation and spinning of worsted-type fibres	0.13	Yes
<i>DA1583</i> Manufacture of sugar	0.60	Yes
<i>DM3511</i> Building and repairing of ships	0.82	
<i>DK2954</i> Manufacture of machinery for textile, apparel and leather production	0.62	
<i>DJ2871</i> Manufacture of steel drums and similar containers	0.09	Yes

<i>DB1824</i> Manufacture of other wearing apparel and accessories n.e.c.	0.44	
<i>DG2417</i> Manufacture of synthetic rubber in primary forms	0.09	Yes
<i>DK2953</i> Manufacture of machinery for food, beverage and tobacco processing	0.56	
<i>DK2972</i> Manufacture of non-electric domestic appliances	0.16	
<i>DA1531</i> Processing and preserving of potatoes	0.26	
<i>DK2921</i> Manufacture of furnaces and furnace burners	0.20	
<i>DI2653</i> Manufacture of plaster	0.03	
<i>DB1751</i> Manufacture of carpets and rugs	0.29	
<i>DK2931</i> Manufacture of agricultural tractors	0.22	
<i>DE2123</i> Manufacture of paper stationery	0.31	
<i>DI2626</i> Manufacture of refractory ceramic products	0.21	
<i>DE2221</i> Printing of newspapers	0.25	
<i>DA1596</i> Manufacture of beer	1.21	
<i>DJ2822</i> Manufacture of central heating radiators and boilers	0.35	
<i>DI2661</i> Manufacture of concrete products for construction purposes	1.06	
<i>DI2622</i> Manufacture of ceramic sanitary fixtures	0.15	
<i>DJ2752</i> Casting of steel	0.13	Yes
<i>DN3613</i> Manufacture of other kitchen furniture	0.40	
<i>DG2451</i> Manufacture of soap and detergents, cleaning and polishing preparations	0.89	
<i>DH2523</i> Manufacture of builders' ware of plastic	0.66	
<i>DA1584</i> Manufacture of cocoa; chocolate and sugar confectionery	0.96	
<i>DB1712</i> Preparation and spinning of woollen-type fibres	0.13	Yes
<i>DI2652</i> Manufacture of lime	0.07	Yes
<i>DJ2873</i> Manufacture of wire products	0.30	Yes
3-digit classification		
<i>DL335</i> Manufacture of watches and clocks		
<i>DC193</i> Manufacture of footwear		
<i>DB176</i> Manufacture of knitted and crocheted fabrics		
<i>DB173</i> Finishing of textiles		
<i>DC191</i> Tanning and dressing of leather		
<i>DN363</i> Manufacture of musical instruments		
<i>DM352</i> Manufacture of railway, tramway locomotives, rolling stock		Yes
<i>DJ283</i> Manufacture of steam generators, except central heating hot water boilers		
<i>DI267</i> Cutting, shaping and finishing of stone		
<i>DB174</i> Manufacture of made-up textile articles, except apparel		
<i>DG247</i> Manufacture of man-made fibres		Yes

6.7 Strengths And Weaknesses Of The Proposed Approach.

In our view, the proposed approach identifies well all those sectors or industries that suffered from substantial production decreases over the reference period. Barring an unlikely rapid scaling back of capacity, these are also sectors that are likely to suffer from excess capacity following the substantial drop in output. Therefore, it would be reasonable to make these industries ineligible for regional State aid for investment project that further expand capacity.

However, because the proposed methodology focuses on output trends as mean for identifying sectors with excess capacity, it does not pick up sectors, such as manufacturing of motor vehicles, where capacity has expanded well ahead of demand and the industry suffers from excess capacity as a result.

However, as there exist no consistent pan-European data capacity or capacity utilisation rates, the only possible avenue for identifying sectors that would need to be added to the List of sectors identified through our proposed approach, would be to rely on ad hoc sectoral information, studies and expert opinions.

Moreover, the 4-digit level of aggregation may still be too high in a number of sectors where sub-sectoral products may exhibit significantly different pattern. It would be worthwhile to explore this issue further by examining how one could complement this analysis with other data sources that could potentially shed additional light on within sector differences. This would be particularly important in the case of a limited number of sectors characterised by relatively high capital intensity (paper, pulp, chemicals, or electronics) and large sized investments.

Ideally, one would apply, to the extent possible, the same methodology at a finer level using data from other sources such as Prodcom, business organisations, etc, if such data are available.

The paper industry provides a good illustration of this issue and how it could be resolved. The STS data show that the output (in volume) of the sector DE211 Manufacture of pulp, paper and paperboard grew by 15% over the period 1996-2001 (see Annex 1). Yet, according to the Prodcom data, within this sector a number of products appear to have recorded sharp declines. For example, production of composite paper and paperboards fell by 82% over the period 1995-1999, the production of uncoated, unbleached kraft paper fell by 18% the production of napkins and napkins liner fell by 9%, etc.). Obviously, the data are not strictly comparable as they refer to different periods, but they suggest that it would be worthwhile to explore this point further in the case of the pulp, paper and paperboard industry.

To undertake this more detailed analysis, it will be necessary to gather all the possible production data on the sub-sectors. Next, it will be crucial to undertake an assessment of the potential production substitutability in order to determine at which level of disaggregation the analysis should be undertaken. This is crucial, as the products of two different sub-sectors may be produced by broadly identical equipment.

6.8 How Often To Update The List Of Sectors

Some might argue that the List of sectors should be updated every year so as to take account of the most industry developments and information. As such an update would not be very much time consuming⁴², one could make a plausible case for annual updates.

However, because structural declines are long-term phenomena that are not quickly reversed, it is unlikely that the List of sectors would change significantly every year. Therefore, in our view, it would probably suffice to update the List of sectors only occasionally.

The main advantage of not undertaking an annual update of the list every year is that it provides some certainty to governments and industry in planning investments ahead.

However, we would advise against extending the life of a List much beyond three to four years as the risk of wrongly identifying an industry as being still in decline increases with the length of the period since the initial evaluation of the state of the industry.

Therefore, on the basis of the discussion above, we would recommend to update in principle the list very three to four years.

6.9 Niche sectors and markets

Using output growth patterns at the 3- and 4-digit industry classification to identify sectors in decline may hide small sub-sectors or niche markets that continue to grow, perhaps even very strongly, despite the general sectoral decline.

Ideally, one would wish to carve out such small sub-sectors from the overall sector and ensure that they are not mistakenly included on the List as part of the broader sector.

Unfortunately, there exists no comprehensive pan-European data set that would allow one to undertake such a carve out. Therefore, the only reprieve that can be provided to such niche sectors is the one provided in the

⁴² The focus here is only on the technical work required for updating the List of Sectors and we abstract from the time and resources required to generate the necessary agreement/support for the new list, should it change.

Commission's communication whereby regional investment aid may be authorised for sectors included in the List⁴³ provided the Member State can demonstrate that although the sector is defined as being in decline, the market for the product concerned is growing faster than EEA-wide GDP over the last five years.

That being said, it will be important to ascertain whether the equipment and structures that would be put in place could easily be used to produce products other than those originally planned and that may be in decline overall in the economy. Once the investment has been made, it may be profitable for the investor to shift production toward such products, such an action will exacerbate the situation faced by the industry at large.

Therefore, before allowing the regional State aid to be provided, it would be important to receive some form of guarantee or undertaking from the aid-granting Member State and the aid recipient that, for at least for a sufficiently long time period, the investment will only be used to produce the intended products.

6.10 Setting the notification threshold

The European Commission noted in its Communication that the threshold, above which all regional investment aid to industries on the List of sectors would need to be individually notified to the Commission, could be set in principle at €25 million and could vary from sector to sector.

A good case can be made that this would be the most logical approach as the potential output expansion arising from a certain investment flow depends crucially on the capital intensity of the underlying production process. The lower the capital intensity, the larger the potential output expansion. In other words, an identical potential output expansion in two different sectors will require a smaller investment in the less capital-intensive sector.

Ideally, one would need to take account of the capital intensity of the sector in setting the sector specific threshold⁴⁴. For example, if capital stock data were available at a very disaggregated level, it would be possible to derive an estimate of the economy-wide capital intensity as well as estimates of the capital intensity for all the sectors individually.

Such information could then be used to scale the notification threshold by assuming that the figure of €25 million relates to the economy on average and multiplying this figure by a sector's relative capital intensity (i.e. the ratio of a sector's capital intensity to the average economy-wide intensity) to obtain the sector specific threshold. The notification threshold faced by highly capital

⁴³ Obviously the conditions defining the allowable aid intensities would have to be met as well.

⁴⁴ This assumes that capital-output ratio of new capital does not differ substantially from that of old capital.

intensive sectors would be higher than €25 million and sectors that are not very capital intensive would face lower notification thresholds.

Alternatively, if the €25 million represents a maximum, each industry's threshold could be set proportionally to the ratio of the industry's capital intensity relative to the capital intensity of the most capital-intensive industry.

For example, the Canadian data suggest that the industry "Basic chemical manufacturing" is the most capital intensive. Thus a threshold of €25 million would apply to that industry. But, for example, the capital intensity of another above average capital-intensive industry such as "Transportation equipment" is only 21% of the capital intensity of the "Basic chemical manufacturing". Thus, its threshold could be set at 21% of the €25 million.

While such an approach mirrors closely the actual capital intensity of various industries, it will yield many different thresholds and may be difficult to manage.

A simplified version of such an approach would be to allocate industries into a few groups (such as very capital intensive, average, below average), apply the €25 million threshold to top group, and implement proportional reductions for the groups.

Alternatively, if data were available on the typical average size of sector specific investments, one could use this information to create a scale of notification thresholds along the lines of the approach described above.

Unfortunately, the data that would be required to undertake such a detailed sectoral analysis do not exist. Therefore, in our view, it appears impossible to develop a logical framework for adjusting upward and downward the notification threshold on the basis of capital intensity.

A totally different approach would be to make the adjustment of threshold dependent on the size of the drop in output (in volume) observed over the period. One could argue that industries having experienced larger falls of output are faced with greater excess capacity than industries having experienced smaller declines in output. Therefore, subsidised investments should be restricted more in those sectors having experienced larger declines in output.

Such an approach appears appealing at first sight as it would allow the Commission to modulate the restrictive impact of the Framework according to the degree of excess capacity. However, such an approach suffers from the major drawback as it does not take into account of capital intensity of the sector. For example, a capital-intensive industry might face a lower notification threshold than a non-capital intensive industry if the latter post smaller output declines. Yet investments of equal size in both sectors would expand capacity by significantly more in the non-capital intensive sector than in the capital-intensive sector. Therefore, we do not believe that it would be

possible to implement a sound scheme that would scale the notification threshold on the basis of the drop in output over the reference period.

Overall, we recommend that consideration be given to vary the threshold with the level of capital intensity of the sector

6.11 Issues For Further Investigation

A number of issues require further investigation before a final “List of sectors” can be established.

First and foremost, the issue of supply substitutability needs to be further explored to evaluate the true state of likely supply substitutability in various sectors and quantify the risk that ignoring this industry dimension may create for the robustness of the “List of sectors”.

Second, it will be crucial to continue to explore with officials from Eurostat how Eurostat may provide useful inputs to application of the methodology with regards to the industries for which no data are presently published for confidentiality reasons.

Third, the issue of separating a structural downturn from a cyclical downturn will require greater attention in the future as the period over which the methodology will be applied in the future will increasingly become influenced by the more general cyclical slowdown of 2000-01.

7 Conclusions

In this Report we presented an overview of the economic literature on declining industries or industries with structural problems, set out an analytical framework that reviews the typical behaviour of various aspects (sales, output, employment) of an industry when the industry is in decline or faces deep structural problems, presented the results of our investigation of the availability of relevant data at the EU or EEA level and detailed a methodology for establishing a “List of sectors” that we judge to be robust and feasible on the basis of our findings on the availability of data.

The literature review shows that simple definitions of declining industries tend to focus on trends in output or production while studies focusing on the multidimensional aspect of industrial decline consider a much richer set of different economic variables. Both approaches tend to focus on absolute and persistent declines in industry performance indicators such as output, sales, etc.

The economic indicators used in multivariate studies of industries in decline can be grouped into four broad categories: industry population dynamics, production, domestic market and external market.

1. Industry population dynamics: firm entry and exit, merger activity and effects on mergers on capacity;
2. Production variables: production capacity, output, value added, shipments, capacity utilization rate, total sales (or turnover) and employment;
3. Domestic market: total domestic use or apparent consumption, domestic market share of imports;
4. External market: level of exports, world market share.

Our analytical review of the pattern that a number of economic indicators are likely to exhibit in declining industries identifies a number of indicators that could be used while minimizing the risks of committing the error of including on the “List of sectors” industries/products that are not in decline. Such indicators are apparent consumption in value, and production in value and volume.

Prices, employment, capacity and investment and the number of firms in an industry, when used on a stand-alone basis, are less robust indicators. However, they could be used in conjunction with a production indicator and, if all indicators were to move in the same direction, this would be a strong indication that the sector is really in decline.

We reviewed various Eurostat dataset, the only consistent pan-European data sources of industrial activity at a detailed level, namely 1) the European System of Accounts (based on national accounts data), ESA 1995, Table 3: Tables by industry – annual exercise; 2), the Structural Business Statistics; 3) The products database Prodcom and 4), the Short-Term Statistics of industrial activity. Following a careful review of the pros and cons of each data source, we have concluded that the fourth data set, i.e. the Short-Term Statistics are the most useful and recommend their adoption for the purpose of applying the proposed methodology for identifying sectors in decline.

Next, we set out the key elements of our recommended methodology for establishing the List of sectors and develop two illustrative List of sectors.

In short, our proposed approach defines sectors in decline as those industries that meet the following three conditions:

1. The industry shows an absolute decrease in production in volume over the reference period.
2. The industry shows an increase in production in value that is lower than the general price increase over the reference period.
3. The industry shows a steady pattern of decline of production in volume as evidenced by the fact that output in volume declined at least during 2 years. This additional condition ensures that output in volume is really in trend decline in the industry and that the overall decline over the reference period does not simply capture one sharp drop in a given year.

In addition, we recommend to apply a further filter based on the capital intensity of the industries.

We recommend to use the industry production data and domestic producer price data from the Short-Term Statistics databank in the application of the proposed methodology and to perform the analysis at the Nace Rev.1 4-digit manufacturing classification level. However, because in some instances Nace does not provide data at a 4-digit level of disaggregation, we recommend undertaking the analysis in those instances at a 3-digit, or even a two 2-digit level.

8 Bibliography

Abernathy, W.J. and Utterback, J.M., (1978), Patterns of Industrial Innovation, Technology Review, 80:7,

Alexander, A. J., (1994), Adaptation to Change in the U.S. Machine Tool Industry in Tan, H.W. and Shimada, H., eds., Troubled Industries in the United States and Japan

Ali-Yrkkö, J., (2002), Mergers and Acquisitions – Reasons and Results, The Research Institute of the Finnish Economy Discussion Paper, No. 792

Amin, A. and Smith, I., (1990), Decline and Restructuring in the UK Motor Vehicle Components Industry, Scottish Journal of Political Economy, Vol. 37

Baden-Fuller, C.W.F., (1989), Exit from Declining Industries and the Case of Steel Castings, The Economic Journal, Vol. 99

Barba Navaretti G. (2000), Gli effetti della liberalizzazione del commercio sul mercato del lavoro nel settore tessile, in Regulatory Reform and Competitiveness in Europe", Edward Elgar.

Brainard S.L., and Verdier, T., (1994), Lobbying and adjustment in declining industries, European Economic Review, Vol. 38

Brainard S.L., and Verdier, T., (1997) The Political Economy of Declining Industries: Senescent Industry Collapse Revisited, Journal of International Economics, Vol. 42

Cantner U. and Hanusch H., (1998), Industrie-Evolution, Universität Augsburg, Institut für Volkswirtschaftliche Lehre, Volkswirtschaftliche Diskussionsreihe, Beitrag 177

Cardoso Marques, A.M. (1999), As fusões e aquisições na reestruturação das indústrias em declínio. Avaliação do sistema de incentivos à revitalização e modernização empresarial (SIRME), mimeo

Corcoran, W. ., (1990), The Machine Tool Industry under Fire, in Losman and Liang, eds., The Promise of American Industry: An Alternative Assessment of Problems and Prospects

Cruz N.M., Gutiérrez Arranz, A.M. and Rodríguez Escudero, A.I., (2002), La estructura de la industria y las decisiones de producto: el caso de la industria farmacéutica española. XII congreso nacional ACEDE Universitat de les Illes Balears Palma de Mallorca

Dasgupta, P. and Stiglitz, J. (1980), Industrial Structure and the Nature of Innovative Activity, The Economic Journal, Vol. 90, Issue 358

Dutz, M.A., (1989), Horizontal Mergers in Declining Industries, International Journal of Industrial Organization, Vol. 7

Fagnart, J.-F., Licandro O. and Sneessens H., (1997), Capacity Utilization and Market Power, Journal of Economic Dynamics and Control, Vol. 22

Filson, D., and Songsamphant, B.,(2001), Horizontal Mergers and Exit in Declining Industries, Claremont Colleges Working Paper 2001-13

Foster, R., (1986), Innovation; The Attacker's Advantage, Summit Books, New York

Gabszewicz, P. and Poddar S., (1997), Demand Fluctuations and Capacity Utilization Under Duopoly, Economic Theory, Vol. 10

Gera, S., and Mang, K.,(1997), L'Economie du Savoir et l'Evolution de la Production Industrielle, Industrie Canada, Document de travail No 15

Ghemawat P. and Nalebuff, B., (1990), The Devolution of Declining Industries, The Quarterly Journal of Economics, Vol. 105

Hillman A.L., (1982), Declining Industries and Political-Support Protectionist Motives, American Economic Review, Vol. 72

Jendges, T., (1994), A Note on Capacity Reduction and the Role of Firm Size in Declining Industries, Small Business Economics, Vol. 6

Jovanic, B. and MacDonald, G.M., (1994), The Life Cycle of a Competitive Industry, Journal of Political Economy, Vol. 102

Jovanic, B. and Rousseau, P.L., (2001), Mergers and Technological Change: 1885-1998, mimeo

King, S.P., (1998), The Behaviour of Declining Industries, The Economic Record, Vol. 74

Klepper, S. and Graddy, E., (1990), The Evolution of New Industries and the Determinants of Market Structure, The Rand Journal of Economics, 21(1)

Klepper S, (1996), Entry, Exit, Growth, and Innovation over the Product Life Cycle, The American Economic Review, Vol. 86, Issue 3

Le Dortz, L. (1995), La Dynamique des Industries Dans Les Approches Evolutionnistes : irréversibilité et émergence des industries, Université de

Paris 1, Matisse Crifes, No. 72, décembre 1995

Lieberman, M.B., (1990), Exit from Declining Industries: 'Shakeout' or 'Stakeout', Rand Journal of Economics, Vol. 21

Malerba, F. and Orsenigo, L., (1996), The Dynamics and Evolution of Industries, Industrial and Corporate Change, 5(1)

Maloney, M.T. and McCormick, R.E., (1988), Excess Capacity, Cyclical Production, and Merger Motives: Some Evidence from the Capital Markets, The Journal of Law and Economics, Vol. 31

McGahan, A. M. and Silverman, B. S., (2000), How Does Innovative Activity Change as Industries Mature, mimeo

McMillan, J., (1994), The Analytics of Industrial Restructuring in Tan, H.W. and Shimada, H., eds., Troubled Industries in the United States and Japan

Meshi, M., (1997), Analytical Perspectives on Mergers and Acquisitions. A Survey, South Bank University London, Centre for International Business Studies, Research Papers in International Business, No. 5-97

Peck, M., Levin, R., and Goto, A., (1988), Picking Losers: Public Policy Toward Declining Industries In Japan in Shoven, J.B., ed. S. O: *Government Policy Towards Industry In The United States And Japan*

O'Connor, D., (1993), Textiles and Clothing: Sunrise or Sunset Industry, in Jomo , K.S. ed., *Industrialising Malaysia*

Sekiguchi, S., (1994), An Overview of Adjustment Assistance in Japan in Tan, H.W. and Shimada, H., eds., Troubled Industries in the United States and Japan

Sheshinski, E. and Dreze, J.H., (1976), Demand Fluctuations, Capacity Utilization and Costs, American Economic Review, Vol. 66

Tan, H. W. and Lewis, E., (1994) Adjustment Responses of Troubled Industries in U.S. Manufacturing. in Tan, H.W. and Shimada, H., eds., Troubled Industries in the United States and Japan

Terasawa, K.L. and Gates W.R., (1994a) Public Policies toward Troubled Industries: A Theoretical Framework in Tan, H.W. and Shimada, H., eds., Troubled Industries in the United States and Japan

Terasawa, K.L. and Gates W.R., (1994b) Multiproduct firms, Labor Fixity, and Firm Adjustment Responses, in Tan, H.W. and Shimada, H., eds., Troubled Industries in the United States and Japan

Unioncamere Emilia-Romagna (1999), Commercio estero in Rapporto sull'economia regionale nel 1999 e previsioni per il 2000, available on the website: <http://www.rer.camcom.it/rapporto/>

Walsh, J., (1991), The Performance of UK Textiles and Clothing: Recent Controversies and Evidence, International Review of Applied Economics, Vol. 5