Economic Classification Policy Committee

Report No. 1

Economic Concepts Incorporated in the Standard Industrial Classification Industries of the United States

August 1994

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Introduction

In 1992, the U.S. Office of Management and Budget (OMB) established the Economic Classification Policy Committee (ECPC), and charged it with conducting a "fresh slate" examination of economic classifications. The ECPC was explicitly instructed by OMB to design an improved conceptual framework for a new industrial classification system to be put into place by 1997.

In the initial part of its investigation, the ECPC published ECPC Issues Paper No. 1, "Conceptual Issues."[1] ECPC Issues Paper No. 1 develops the concept of the production-oriented, or supply-based, industry classification. It also links the production-oriented economic concept to the preparation of data that would be appropriate for analyses of production, productivity, input intensities, and so forth. All of these uses share the requirement that the data be constructed according to the production-oriented concept.

A second economic concept, the market-oriented or demand-based economic classification system, is also developed in ECPC Issues Paper No. 1. The paper shows that the market-oriented concept results in data that are appropriate for marketing studies, demand studies, market share studies, and related analyses.[2]

Emphasis on economic concepts is a relatively new approach to developing economic classifications. The ECPC's focus on economic concepts is responsive to views expressed by many of the

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[1] Economic Classification Policy Committee, Issues Paper No. 1, "Conceptual Issues," *Federal Register*, March 31, 1993, pp. 16991-17000.

[2] ECPC Issues Paper No. 1 asked for public comment on the appropriateness of these two alternative frameworks for a new classification system for the United States. A report, "Summary of Public Comments to ECPC Issues Papers Nos. 1 and 2," is available upon request from the ECPC.

participants at the 1991 International Conference on Classification on Economic Activities.[3]

More fundamentally, the ECPC's emphasis on economic concepts for economic classifications is, equivalently, an emphasis on the uses of industrial data, particularly the uses of such data in economic analysis. When data uses are emphasized to develop economic classifications, the first step is an explicit analysis of the major uses of data that are based on economic classifications; the second step is to derive, and from the economic framework and economic concepts that underlie the uses of data, implications for the design of economic classification systems. Tying the design of economic classifications explicitly to the economic uses of classified data is the major innovation introduced by the ECPC, compared with past work in classifications.

The ECPC determined early in its review process that it was essential to understand the underlying concepts embedded in the existing U.S. Standard Industrial Classification (SIC) system, before recommendations could be made on developing a new system. The present U.S. SIC system originated over 50 years ago and has been revised many times, most recently in 1987. Little documentation now exists on how the SIC system was developed and on its revisions since its inception. For example, no written documentation was produced on the 1987 SIC revision, though some internal files exist for earlier SIC revisions. The bases for decisions that led to the current U.S. system have been lost in time.

Many different views about the structure of the present U.S. SIC system have been expressed. Not surprisingly, many of the criticisms that have been made of the U.S. SIC system reflect these different views about the structure of the system, and of the purposes for which it was designed. Moreover, some critics have in mind uses for industrial data that differ from, and are not always fully consistent or compatible with, the uses desired by others who have criticized the system.

In one view, the U.S. SIC system embodies primarily production-oriented concepts, and (depending on their views about the ideal classification system) persons who hold this view contend that the production-oriented decisions should either be changed, or that production-oriented decisions should be

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[3] Bureau of the Census, *Proceedings*, International Conference on Classification of Economic Activities, Williamsburg, Virginia: U.S. Department of Commerce, November 6-8, 1991, 587 pages. Available from Bureau of the Census, Room 2069-3, Washington, D.C. 20233.

implemented more consistently throughout the system. Others with a different view of the system feel that it is primarily a market-oriented system, which is either favored or not, depending on the view of the speaker.

Some have also said that the present SIC system reflects different decisions, depending on stage of process--that is, primary goods industries, for example, have been treated differently in past SIC decisions from finished goods industries. Still others have said that differing concepts have been incorporated into different parts of the SIC system. Differing concepts may have been adopted because of inherent differences in the structure of production and of markets across different sectors of the U.S. economy, or because trade associations, and to an extent corporate structures, vary as to organizing principle, and these organizations have influenced past decisions about the SIC system.

Because so many differing views have been expressed about the present U.S. SIC system, the ECPC initiated a study to ascertain the conceptual basis of industries in the system. A similar study of the Canadian SIC system has been conducted by Statistics Canada. This paper explains how those reviews were conducted and presents the results for the United States. A companion paper[4] presents results for Canada.

I. The Idea of a Concept-based Industry

As described in ECPC Issues Paper No. 1, a production-oriented or supply-based industry is one in which the production technology of the industry--described by the production process itself, the materials used, the type of labor employed, or some combination of these--uniquely defines the industry. That is, when an industry is defined on a production-oriented concept, the producing units that are grouped within the industry's boundaries share a basic production process, they use closely similar technology. Producing units in no other industry share the same technology and production process. In the language of economics, producing units within an industry share the same production functions; producing units in different industries have different production functions. The boundaries between industries thus demarcate, in principle, differences in production processes and production technologies.

In contrast, a market-oriented or demand-based classification is one in which either the products form a unique

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[4] Young, Kenneth, "The Conceptual Basis of the Standard Industrial Classification," Standards Division, Statistics Canada, February 1994.

market, or the products are used and/or distributed together. If the grouping is a "market" category, then the products included in it are closer substitutes among themselves than are any products outside the industry. If products are used together (complements), or share distributive networks, this is another basis for a demand-based classification.[5]

Obviously, both conceptual definitions leave a great deal of room for interpretation. For example, a market-oriented industry might be defined in terms of the cross price elasticities of demand between the products within the industry versus products outside the industry (or alternatively, on what are known as "elasticities of substitution"). However, comprehensive empirical information on substitution among commodities--from marketing studies or from demand studies, for example--was not available for the ECPC study. In the absence of data on substitution, markets may be considered more broadly or more narrowly. Where, for example, does one draw the boundaries among markets for different kinds of beverages? If different kinds of soft drinks are close substitutes, are not soft drinks also substitutes for juices? for milk? for beer? The working group carrying out the ECPC study had to impose its judgment about what seemed reasonable market categories.

Similarly, production processes may be considered broadly or narrowly. For some purposes, welding and brazing are the same process; for others, they are not. Manufacture of parts may involve quite different technology from assembly of the parts into the ultimate product, and the two kinds of processes may or may not occur together in the same establishment. In many cases, the production process that leads to a particular product may in fact be a set of interrelated but distinct processes that are performed together in the same establishment. Moreover, vertical integration of these interrelated processes may be present in some establishments and not in others, which must also be considered in the judgments incorporated into the matrix. Again, provisional judgments on production processes had to be made in order to carry out the study.

The ECPC wishes to emphasize the role of judgment in the review that is contained in this report. The working group's results were inevitably constrained by the information available to it, so its findings should be viewed as preliminary, and as a basis for further discussion. Comment on the judgments in the

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[5] ECPC Issues Paper No. 1 also discusses Hicksian aggregation and functional aggregation as alternative bases for market-oriented classifications. For lack of information, no attempt was made to judge whether industries corresponded these standards for forming demand-based industries.

matrix, from industry representatives or other knowledgeable persons, is solicited and welcomed.

ECPC Report No. 1 presents to the public more information about the production-oriented and market-oriented concepts described in ECPC Issues Paper No. 1, particularly on how these economic concepts can be used in pragmatic ways to guide the process of determining industry classifications. The ECPC has requested (see *Federal Register*, July 26, 1994) that proposals for new or modified industries be based on implementing the production-oriented economic concept. The information in the matrix, and the review process that is described in this ECPC report, can accordingly provide information and guidance to those individuals or organizations who are interested in proposing new 4-digit industries or modifying existing ones.

II. The Matrix

A working group reviewed individual U.S. 4-digit industries to determine if a conceptual basis for each industry could be identified. A subset of the 1,004 U.S. 4-digit industries was chosen for study. The 4-digit industries examined included all those in the following SIC major groups.

Goods-producing major groups ("2-digit industries") were selected to include capital, consumer and intermediate goods, and both durables and nondurables:

Major Group 20	Food and Kindred Products
Major Group 23	Apparel and Other Finished Products Made from Fabrics and Similar Materials
Major Group 33	Primary Metal Industries
Major Group 35	Industrial and Commercial Machinery and Computer Equipment
Major Group 37	Transportation Equipment

The 175 4-digit industries in the above 2-digit major groups accounted for 37 percent of the 459 industries in manufacturing, and 43 percent of U.S. manufacturing value of shipments in the 1987 Economic Censuses (table 1).

The working group also studied the 60 4-digit industries in the following Major Groups in the services sectors:

Major Group 72	Personal Services
Major Group 73	Business Services

Major Group 87 Engineering, Accounting, Research, Management, and Related Services

The services industries selected for review accounted for 43 percent of services industry receipts, the same proportion as the manufacturing industries included the study. The services industries also included many that provided rigorous "test cases" for application of the economic concepts.

In total, the working group reviewed 235 industries, 23 percent of the 1,004 U.S. SIC 4-digit industries. These industries accounted for 19 percent of U.S. total value of shipments or receipts in 1987.

At the beginning of its work, the matrix working group designed a questionnaire that helped focus the discussion for each industry. A copy of that questionnaire is reproduced as Appendix A.

Each 4-digit industry was discussed at length among the members of the working group until a consensus was reached on the presence or absence of an economic concept that described the industry. The discussion was directed, either explicitly or implicitly, by the questionnaire, Appendix A. Answers to the questions on the questionnaire dictate the corresponding entries in Appendix B, according to the rules set forth in the instructions on the questionnaire.

The results of the review are documented in the "Matrix of Economic Concepts in Selected U.S. SIC Industries" (Appendix B). The matrix shows the extent that each U.S. 4-digit SIC industry corresponds to production-oriented or market-oriented classification concepts, as those concepts are explained in ECPC Issues Paper No. 1.

It is important to emphasize again the judgment involved in this process. Judgments are incorporated into the matrix, and those judgments are inherently subjective. None of the working group members qualified as an authority on the technology and production processes used in the 4-digit industries that were studied, nor were they necessarily marketing experts. Other analysts may disagree with the judgments the working group made, or have access to better information than was available to them. Individuals from within the industries themselves, individuals who have carried out marketing studies on products produced within these industries, and other private sector and government industry authorities would no doubt be able to add valuable information on production technologies and on markets for all of the industries that were studied by the working group.

The ECPC welcomes comments from informed persons on thejudgments incorporated into the matrix. Those judgments

should be considered as the basis for further discussion, for refinement, and for revision when more expertise on particular markets and production processes becomes available, either from industry comments or from elsewhere. The matrix in its present stage can thus be thought of as a preliminary review of the U.S. classification system, and it is subject to revision as additional information is received from industry and other sources.

Forming the Matrix from the Questionnaire

Reviewing the questionnaire (Appendix A) is useful, not only for understanding how the matrix (Appendix B) was constructed, but also to explain the symbols that are used in the body of the matrix. Each question in the questionnaire has a counterpart column in the matrix; both the questions in the questionnaire, and columns in the matrix, are organized into production-oriented (supply-based) and market-oriented (demand-based) blocks.

Consider first the production-oriented questions (part A of the questionnaire). The first question under part A asks whether there is a common production process that is shared by the establishments in this industry, and if it is a production process that distinguishes those establishments from producers in other industries. An affirmative answer means that the production process <u>defines</u> the industry, and the letter "D" (defines a conceptually based industry) was entered in the matrix under the column labeled "process." Thus, taking as an example SIC 2021, Creamery Butter, the process of churning to make butter appears unique to this industry, the more so if one considers the fundamental input (cream) that also characterizes this industry.

As implied by the butter example, question A.2 asks a similar question about the material or materials used in the industry. A material was considered to define an industry <u>only if</u> the characteristics of the material imply a fundamental part of the technology. For example, the physical properties of cream dictate the technology used to separate butter. As another example, the physical properties of fluid milk dictate many of the processing methods and the types of machinery and equipment that must be used to handle it.

The working group considered material as a way of isolating aspects of the technology and the production process that were associated with a particular material, aspects that might not otherwise have been considered fully or might not otherwise have been understood adequately by the working group members. An industry's mere use of a characteristic, unique or major material is not sufficient to define a production-oriented industry. For example, baking chocolate cakes implies the use of chocolate, which is not an ingredient in baking white cakes; but nothing in the technology of cake baking differs fundamentally with the

presence or absence of chocolate, so the use of this material does not define the technology of an industry. As another example, open-pit mining of different ores using the same mining technology would not necessarily be placed in different production-oriented industries; one would have to consider the entirely of the mining process, not just the ore.

Though it was central in many services industries, the labor question, A(3), did not define the technology of manufacturing industries. An exception is SIC 3544, Special Dies and Tools, Die Sets, Jigs and Fixtures, and Industrial Molds, where highly skilled tool and die makers were considered an important element in defining the industry.

A positive answer to questions A.1 or A.2 led to the judgment that the industry is defined on a production-oriented concept. In such cases, the associated symbol "D" was entered in the appropriate column of the production-oriented side of the matrix.

A similar process was used for the market-oriented portion of the questionnaire. Using once again the example of SIC 2021, Creamery Butter, the working group determined that the primary products produced in this industry (butter, of different types and in different packages) are better substitutes for each other than is any product of any other industry. Thus, butter itself is a reasonable market category (Appendix A, question B(1)). This answer leads to the symbol "D" (again meaning that it defines a conceptually based classification, this time on the market-oriented side) under the column "market" in the matrix (Appendix B, fourth column). The working group also noted that a broader market category might include margarine and other fats and oils, which underscores the judgment that must be made in constructing the matrix.

In the case of SIC 2021, Creamery Butter, the symbol "D" appears on both the production-oriented, supply-based side of the matrix and the market-oriented, demand-based side of the matrix. This means that data for the butter industry are appropriate for use in production-related analyses and also in demand and marketing analyses. Accordingly, creamery butter is designated an "ideal" industry, and is so coded under the "ideal industry" column of the matrix.

The working group considered the possibility that the establishments in an industry might share a common production process among them, yet the same or a closely-similar production process might be used in other industries as well (Appendix A, question A(1)(a)). In such cases, the industry would include only part of a production process, and the symbol "P" (for partial process) was entered in the appropriate column in the production-oriented side of the matrix. For example, a similar

processing and freezing technology is used by the establishments in SIC 2037, Frozen Fruits, Fruit Juices, and Vegetables, but it is by no means a unique process for this industry; in Canada, frozen fish are produced in the frozen fruit and vegetable freezing establishments using the same process. In the matrix, the symbol "P" (for "part") appears under process for industry 2037, because the industry as now defined appears to include only part of an industry defined on a production-oriented concept.

Where the symbol "P" appears on the production-oriented side of the matrix, this implies that a better production-oriented industry could be constructed by combining this industry with some other industry or industries, or parts of them. The candidate industries for combination are listed in the "Comments."

The opposite case is where one present SIC 4-digit industry encompasses more than one production process (Appendix A, question A(1)(b)). For these cases, the matrix symbol "M" (for multiple process) is used. For example, SIC 2034, Dried and Dehydrated Fruits, Vegetables, and Soup Mixes, consists of two production processes: One set of establishments uses dehydration technology; another set of establishments mixes dehydrated ingredients into soup mixes. The working group commented that separating soup mixes from the dehydrated fruit and vegetables portion of the industry would create a better production-oriented industry (in this case, they also judged that it would improve the grouping as a marketing category).

On the market-oriented side, similar definitions of "P" and "M" symbols were used. For example, all of the products produced in an industry might belong to the same market, but products from some other industry might also belong in this market (Appendix A, question B(1)(a)). These cases are treated in parallel with the partial process industries: The symbol "P" (for part market) is entered in the appropriate column or columns of the market-oriented side of the matrix. If multiple markets exist within an industry (Appendix A, question B(1)(b)), an "M" is entered in the appropriate column of the matrix, Appendix B.

The final column in the matrix records cases where the working group gave a negative answer to every question on the questionnaire. For example, SIC 2023, Dry, Condensed, and Evaporated Dairy Products, combines neither common production processes nor does it correspond to a marketing category, so far as the working group's judgment could discern. For this reason, the symbol "N," for "No conceptual basis," was entered in the far right-hand column of the matrix. Most of the SIC system's "99" or "not elsewhere classified" (nec) industries lack any economic concept by definition, and were recorded "N" in the matrix. All these industries are candidates for restructuring.

Industry Examples from the Matrix

It is instructive to go through a few additional examples to understand the reasoning that went into the matrix.

Consider first industry 2096, Potato Chips, Corn Chips, and Similar Snacks. Following the questionnaire, there does seem to be a common process in the industry--frying, or oil cooking. Frying would define the technology used in this industry, except that it occurs in other food industries also. Thus, the working group entered "P" in the process column.

On the demand side, using judgment the working group decided that SIC 2096 is a reasonable market category. If it were building a market-oriented system from scratch, the group might also include pretzels and nuts in the snack foods market category.

Another market-based food industry is Natural, Processed, and Imitation Cheese (SIC 2022). One might think that cheese-making would be a process-based industry, and so it would. However, SIC 2022 contains imitation cheese, cheese "analogs," cheese dips, and so forth, which do not share similar production processes, or even similar materials. SIC 2022 is thus classified only as a market category.

An interesting interaction between production-oriented and market-oriented categories arises in the two candy industries (2064 and 2066). Establishments in the candy industry itself (SIC 2064, Candy and Other Confectionery Products) do not appear to share any common production process. Instead, candy seems to be a market grouping. It is, however, not a complete market. Although chocolate bars made by producers that do *not* grind and process the cocoa beans are in the candy industry (SIC 2064), chocolate bars made by fully integrated chocolate makers are in another industry, SIC 2066, Chocolate and Cocoa Products. The chocolate industry, SIC 2066, seems to be defined primarily on the production process of grinding and processing cocoa beans: That is, SIC 2066 is primarily a production-oriented industry. Many of the resulting products are not close substitutes (baking chocolate for example), and therefore do not make up a single market category. Because the candy industry, SIC 2064, includes some chocolate bars, but not others, it is only a partial market category; its related industry, the chocolate industry, SIC 2066, has some attributes of a production-oriented industry.

Another example is SIC 3562, Ball and Roller Bearings. The bearing-making process was judged unique, so "D" was entered under process. On the market side, the products also form a unique market, although a more complete market also would include plain bearings, which are close substitutes in some applications. Since the industry is uniquely defined on both the supply and

demand sides, it meets the criteria for an "ideal" industry, and has been denoted as such.

Note, as the bearing industry example shows, that the designation "ideal" indicates only that data for the industry as presently defined can be used both for production analyses and for market analyses. It does not indicate that some refinement or revision of the present industry definition would or would not make the industry even better for one or more of the intended data uses.

Another manufacturing example is SIC 3563, Air and Gas Compressors. This industry is titled incorrectly: It actually consists of "air and gas compressors, and spraying, dusting, and painting equipment." Correctly titled, it neither combines establishments employing a unique process (or labor type, or material) nor does it comprise a unique market. Compressors are often used with spraying and painting equipment, but the products that are included in this industry cannot be viewed as complements either. The industry thus appears to have neither a production nor a market basis, and was coded "N," which signifies the belief of the working group that the industry as now defined corresponds to no conceptual basis.

Clothing industries were, in general, problems. It is difficult to see that the production process for Men's and Boys' Suits, Coats, and Overcoats (SIC 2311) is significantly different from the production process for Women's, Misses,' and Juniors' Suits, Skirts, and Coats (SIC 2337), or from that for Men's and Boys' Separate Trousers and Slacks (SIC 2325). Moreover, these industries all include several levels of integration: Integrated manufacturers that purchase materials and "cut and sew" the garment; contractors that do not own the material, but only manufacture the garment for another entity; and jobbers that own the material and perhaps style the garment, but contract out for the garment's manufacture. The actual processes involved in nearly all the 4-digit industries in Major Group 23 are the same in each industry, namely: design the garment, purchase the material, cut the material, and sew the garment. It also is difficult to see why a clothing establishment that makes men's coats (or a cut-and-sew shop that cuts and sews men's coats) could not, in principle, do the same operation on women's coats. For this reason, the working group entered "P" under process for all the 4-digit clothing industries, indicating that there seems little basis from the production-oriented concept for the dividing lines that are drawn in the present SIC 4-digit clothing industries.

Clothing industry establishments do, however, seem to specialize in either men's, women's or children's clothing, or at least that was true in the past. The clothing industries appear to represent marketing categories, or categories that are defined

by the distribution practices in the industry. Establishments apparently specialize to produce apparel products according to marketing conventions. The working group coded almost all of the clothing industries as partial market categories.

The working group did not feel very confident in any of its judgments with respect to apparel industries. Notice that there are a fair number of 'N' industries in the clothing and textiles section, industries that seem to lack a conceptual foundation, at least to the extent of the working group's knowledge of them. Particular examples are the "Schiffli Machine Embroideries" industry, SIC 2397, and the "Pleating, Decorative and Novelty Stitching, and Tucking for the Trade" industry, SIC 2395. The ECPC will obtain additional information from industry and trade groups regarding the economic concepts for apparel industries, and will as well consider information on the classification of apparel from Canada and Mexico.

Primary metals provide many examples of production-oriented industries. However, a large number of the primary metals industries either incorporate multiple processes within them (coded "M" under process) or share processes across several current SIC industries (coded "P"). For example, aluminum, copper, and other nonferrous foundries, SIC 3365, 3366, and 3369, respectively, do not seem to be separated by production process, but by input material only. Unless the input metals have implications for the foundry processes that must be employed on them, these three seem partial process industries, and might be combined into a wider production-oriented industry.

Services Industry Examples

Information on services industries is less abundant, and the services classifications themselves are less well developed than is true in manufacturing. For this reason, even more judgment was required to determine the conceptual basis for services industries.

In services, it was anticipated (see ECPC Issues Paper No. 6, "Services Classifications") that specialized labor inputs would be a major factor in assessing industries on the production side. Many services industries sell the capabilities of their employees, and though employee contributions to the quality of the product are also vital to goods production, employee skills are essential aspects of what services producers do. Thus, in services industries, the questionnaire's labor question (Appendix A, question A(3)) was particularly important.

One example is SIC 7323, Credit Reporting Services. The production process in this industry involves information collection and processing; one could argue that many other services industries also conduct information processing

activities. The working group decided that the personnel performing similar tasks at banks and financial institutions and at mortgage firms likely use similar skills, and that the on-line information retrieval process in SIC 7323 was shared with SIC 7375, Information Retrieval Services. This, the working group decided, warranted a "P" under process. On the demand side, the working group decided that the credit reporting service industry is a unique market, and a "D" was entered in the market column for SIC 7323. It is probably true that financial institutions provide similar services, but they do so mainly for themselves.

A number of "ideal" industries were identified among the services industries examined. For example, SIC 8712, Architectural Services, requires unique skills. Many years of schooling and training are required before one is licensed as an architect, and these skills define what an architectural firm sells. This influenced the group to code this industry "D" under the labor column on the production-oriented side. On the demand side, the whole range of services offered by an architectural firm is unique and not readily substitutable from other industries (though substitution may occur for some of the individual services). Thus, a "D" was placed in the market column of the matrix. With D's on both sides of the matrix, SIC 8712 qualifies as an ideal industry. Note that coding SIC 8712 as ideal does not preclude subdividing this industry, on the basis of additional information on architectural services and their markets, into components that might also be ideal.

III. Results of the Review

Information from the 1987 Census of Manufactures permits tabulating the relative importance of industries that have been placed in the different categories of the matrix.

Table 1 presents the proportion of U.S. industries that were selected for analysis in the matrix, and the proportion of total U.S. value of shipments accounted for by these industries. Considering just the manufacturing and services industries divisions from which matrix industries were drawn, matrix manufacturing industries accounted for $1.06 trillion of shipments, 43 percent of manufacturing shipments of $2.48 trillion. Matrix services industries had 1987 receipts of $329 billion, 43 percent of the $772 billion of receipts for the service industries. Overall, the 235 industries reviewed in the matrix accounted for 19.3 percent of total 1987 industry value of shipments or receipts.

Manufacturing Industries

Table 2 presents the results for manufacturing industries. It suggests that the current U.S. SIC has no single dominating

economic concept. In the following, all percentages relate to the totals for the manufacturing major groups included in the study. They might change somewhat if all the 459 manufacturing industries were included.

Only 16.6 percent of the industries (accounting for 18.8 percent of value of shipments for the manufacturing industries included in the study) are fully defined on a production-oriented concept. Roughly half of these are ideal industries, that is, cases where the same industry definition would emerge from application of either the production-oriented or the market-oriented economic concept.

A fifth (20 percent) of manufacturing industries are partial production-oriented industries (P). As noted, these are cases where combination with some other industry, or parts of another industry, might create a better production-oriented industry.

Another fifth (21.1 percent) of manufacturing industries encompass multiple production processes (M) within the same SIC industry definition. Multiple-process industries, however, account for a third of manufacturing shipments, so they are among the relatively larger industries in economic importance. Multiple-process industries could be made into fully-defined production-oriented industries with relatively simple divisions of the presently-defined industries.

Over all, roughly three-fifths (58.3 percent) of manufacturing industries incorporate the production-oriented concept in some way (whether "D," "M," or "P"). Two-fifths (41.7 percent) of manufacturing 4-digit industries, accounting for more than a third of manufacturing shipments, have no production-oriented basis in the current SIC classification system. A number of these are "nec" industries, which are appropriate subjects for review and redefinition.

The situation is not much different with respect to the market-oriented concept. A somewhat larger number of present 4-digit manufacturing SIC's are fully defined according to the market-oriented concept (27.4 percent). Another quarter of manufacturing industries (26.9 percent) are partial markets, accounting for about the same share of manufacturing shipments as the fully-defined market industries (20.2 and 23.2 percent of shipments, respectively). A bit more than two-thirds of manufacturing industries (69.1 percent) incorporate the market-oriented concept in their definitions in some way ("D," "M," or "P").

By shipments shares, 10 percent of manufacturing shipments arise from ideal industries in the groups of the present SIC system that were examined for the study. This is more than

equalled by the 17.1 percent of shipments that come from industries with no conceptual basis.

The percentages discussed in this section and displayed in Table 2 pertain only to the manufacturing major groups chosen for the review. Manufacturing groups that have not yet been reviewed account for more than half of manufacturing, so the picture might change when a full review of all 459 manufacturing industries is carried out.

Manufacturing 2-digit Major Groups

Tables 3 and 4 expand on the information in Table 2 by presenting similar tabulations for those 2-digit major groups in manufacturing that were selected for review. Table 3 tabulates the percentages of 4-digit industries within each 2-digit major group, and corresponds to the percentages presented for manufacturing as a whole in the left-hand portion of Table 2; Table 4 tabulates the same information, weighted by value of shipments, and so corresponds to the percentages tabulated for manufacturing as a whole in the right-hand portion of Table 2.

In these tables, the food industries (SIC 20) and the primary metal industries (SIC 33) have the largest percentages of fully-defined production-oriented 4-digit industries. If one adds in the large proportion (76 percent, by value of shipments) of multiple-process primary metal industries in SIC 33, this SIC major group appears already largely to conform to the production-oriented classification concept.

A large proportion of apparel industries (SIC 23) were coded partial process, for reasons noted in section II, above. Machinery industries (SIC 35) seem to have been defined most often by market-oriented concepts, where they fit an economic concept at all. Few machinery industries have been defined to be consistent with the production-oriented economic concept (over 70 percent of these industries were judged to have no production-oriented basis).

Transportation equipment (SIC 37) 4-digit industries include a large proportion that have multiple processes (56 percent by value of shipments) and multiple markets (68 percent, by value of shipments, counting those cases where an industry has simultaneously partial market and multiple markets in the same SIC). Multiple process industries are possible candidates for division to make smaller industries that more closely conform to the production-oriented concept.

Stage of Process

Some have expressed the view that the concepts implemented in the U.S. SIC differ by Stage of Process (SOP). On this view,

industries that are in lower SOP's (crude and primary materials producing) are more likely to be production oriented. Final products industries may be market oriented.

Tables 5 and 6 contain computations that are similar to those presented in earlier tables, but they are arranged according to the Bureau of Labor Statistics SOP for each 4-digit industry (where available). The SOP classification groups industries into Crude, Primary, Semifinished, and Finished categories, based on the input-output tables published by the Bureau of Economic Analysis. Producers that ship 75 percent or more of their output to final demand are designated as Finished processors. Producers that ship 60 percent or more of their output to finished producers and final demand, but less than 75 percent to final demand, make up the Semifinished processors category. Producers shipping 60 percent or more of their output to semifinished or finished producers, but less than 75 percent to final demand are Primary processors. Crude producers are the industries left over after the other stages were defined.[6]

As the tables show, the evidence suggests a weak relation. The proportion of fully-defined production-oriented industries is indeed highest at the crude stage (30 percent) and lowest at the final goods stage (12 percent), and multiple-process industries show a similar pattern. But the differences in percentages among the various stages of process are not large, and nearly as many crude processing industries as final demand industries have no production-oriented basis.

Similar statements can be made on the market-oriented side. Somewhat more final goods industries (36 percent) than crude processing industries (20 percent) are fully-defined by the market-oriented concept. The differences in percentages, however, are not large, and they do not increase progressively from lower to higher SOP.

Tables 5 and 6 show that the expected SOP patterns do not hold, even if the definition of production or market orientation is extended to include partial industries or partial markets. Of course, the sample of industries included in the matrix is incomplete. Further review of other SIC major groups will provide additional evidence on the relation, if any, between SOP and the economic concepts of SIC 4-digit industries.

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[6] Gaddie, R., Zoller, M., "New Stage of Process Price System Developed for the Producer Price Index," *Monthly Labor Review*, April 1988, pp. 3-16.

Services Industries

Table 7 presents results for the services industries. As with manufacturing, the analysis of services industries suggests that the current U.S. SIC has no single dominating economic concept.

Services have a higher percentage of fully-defined industries, 21.7 percent for production-oriented and 30.0 percent for market-oriented industries, than manufacturing has. For services industries, 26.7 percent were categorized as containing multiple production processes, which may indicate that these processes could be the basis for partitioning services activities into a larger number of fully-defined production-oriented industries. Only 13.3 percent (9.0 percent by value of receipts) were partial process. On balance, therefore, the groups' judgment suggests a greater need for splitting existing services industries than for combining them.

Roughly the same proportion of services industries show some market-oriented basis (75.0 percent) as show some production-oriented basis (73.3 percent). However, the high percentage of services industries categorized as having partial markets (31.7 percent) or no market-oriented basis (25.0 percent), implies that many services industries in the present SIC do not correspond to well-defined market groupings.

Turning to the results by 2-digit services major groups (tables 8 and 9), we find that the largest percentage--62 percent--of poorly defined groupings occur in Major Group 87, Engineering, Accounting, Research, Management, and Related Services, representing about 39 percent of the total value of receipts for Major Group 87. Major Group 87 is equally poorly defined with respect to the market concept; perhaps its very title, which suggests an amalgam of professional services, provides a clue to the source of the problem.

The largest percentage of fully defined industries, for both concepts, is found in Major Group 73, Business Services. Here 31 percent of industries representing 20 percent of value of receipts were judged fully defined on a production basis, and 38 percent of industries representing 18 percent of value of receipts were judged fully defined on a market basis. Including those industries that are partially defined on the production concept raises the percentage of production-defined industries to 50 percent, representing 36 percent of the value of receipts for the major group. Fully defined and partial market industries sum to 79 percent of the industries in the major group, representing 59 percent of the value of receipts.

Major Group 72, Personal Services, is the only services major group containing no ideal industries. The reason seems to

lie in the collection of establishments contained therein: These are laundries, photographic studios, barber shops, shoe repair shops, funeral services, tax preparation, and other miscellaneous services.

Table 1.--Matrix Analysis: Proportions of Industries Included in Matrix				
	Number of industries	Percent	Value of shipments or receipts (Millions of dollars)	Percent
All SIC industries	1,004	100	7,234,108	100
Manufacturing industries, total	459	46	2,475,901[a]	34
Service industries, total	150	15	772,194[b]	11
All other industries	395	39	3,986,013	55
All matrix industries	235	23	1,394,051	19
Manufacturing matrix industries:				
In relation to total industries	175	17	1,064,806	15
In relation to manufacturing industries	175	37	1,064,806	43
Services matrix industries:				
In relation to total industries	60	6	329,245	5
In relation to services industries	60	40	329,245	43

a/ Bureau of the Census, *1987 Census of Manufactures, General Summary: Industry Product Class, and Geographic Area Statistics*, MC87-S-1, U.S. Department of Commerce, March 1991, Table 3.

b/ Bureau of the Census, *1987 Census of Service Industries, Geographic Area Series: United States*, SC87-A-52, U.S. Department of Commerce, November 1989, Table 1a.

Table 2.--Matrix Analysis of Manufacturing Industries: Proportions of Production-Oriented and Market-Oriented Industries				
	Number of industries	Percent	Value of shipments (Millions of dollars)	Percent
Matrix industries in manufacturing	**175**	**100**	**1,064,806**	**100**
Production-oriented	102	58.3	678,102	63.7
Fully-defined industry (D)	29	16.6	200,474	18.8
(Of which: Ideal industry)	(15)	(8.6)	(108,523)	(10.2)
Partial process industry (P)	35	20.0	119,392	11.2
Multiple process industry (M)	37	21.1	357,780	33.6
Both partial and multiple processes (PM)	1	.6	456	0.0
No production-oriented basis	73	41.7	386,704	36.3
Matrix industries in manufacturing	**175**	**100**	**1,064,806**	**100**
Market-oriented	121	69.1	779,008	73.2
Fully-defined market (D)	48	27.4	246,552	23.2
(Of which: Ideal industry)	(15)	(8.6)	(108,523)	(10.2)
Partial market (P)	47	26.9	215,751	20.3
Multiple markets (M)	22	12.6	163,428	15.3
Both partial and multiple market (PM)	4	2.3	153,277	14.4
No market-oriented basis	54	30.9	285,798	26.8
Ideal industries	15	8.6	108,523	10.2
No conceptual basis, neither production nor market	31	17.7	182,352	17.1

Table 3.--Manufacturing SIC Major Groups: Percentages of 4-digit Production-Oriented and Market-Oriented Industries						
SIC Major Group	20	23	33	35	37	Total
Number of 4-digit Industries	49	31	26	51	18	175
Production-oriented (percent)	75	54	92	28	44	58
Fully-defined industry (D)	33	3	27	6	11	16
Partial process industry (P)	18	48	19	4	11	18
Multiple process industry (M)	24	3	46	16	22	21
Both partial and multiple processes (PM)	0	0	0	2	0	1
No production-oriented basis (percent)	24	45	8	72	56	43
Market-oriented (percent)	88	65	23	71	88	68
Fully-defined market (D)	33	10	4	45	28	27
Partial market (P)	37	55	19	6	16	26
Multiple markets (M)	14	0	0	16	38	12
Both partial and multiple market (PM)	4	0	0	4	6	3
No market-oriented basis (percent)	12	35	77	29	11	31
Ideal industries (percent)	18	0	4	6	11	8
No conceptual basis, neither production nor market (percent)	10	26	4	29	11	18

Major Groups: 20 Food and kindred products
23 Apparel and other finished products made from fabrics and similar materials
33 Primary metal industries
35 Industrial and commercial machinery and computer equipment
37 Transportation equipment

NOTE: Percentages do not always add to 100 owing to rounding.

Table 4.--Manufacturing Major Groups: Percentages by Value of Shipments

SIC Major Group	20	23	33	35	37	Total
Value of Shipments	329,707	64,246	120,248	217,668	322,937	1,064,806
Production-oriented (percent)	70	59	95	35	65	64
Fully-defined industry (D)	36	1	14	17	8	19
Partial process industry (P)	17	58	5	6	1	11
Multiple process industry (M)	17	0	76	12	56	34
Both partial and multiple processes (PM)	0	0	0	0	0	0
No production-oriented basis (percent)	29	41	5	65	35	36
Market-oriented (percent)	89	68	17	69	1	73
Fully-defined market (D)	30	5	1	50	10	23
Partial market (P)	39	63	16	6	3	20
Multiple markets (M)	14	0	0	11	28	15
Both partial and multiple market (PM)	6	0	0	2	40	15
No market-oriented basis (percent)	10	31	83	31	19	27
Ideal industries (percent)	14	0	1	17	8	10
No conceptual basis, neither production nor market (percent)	9	29	1	31	19	17

Major Groups: 20 Food and kindred products
23 Apparel and other finished products made from fabrics and similar materials
33 Primary metal industries
35 Industrial and commercial machinery and computer equipment
37 Transportation equipment

NOTE: Percentages do not always add to 100 owing to rounding.

Table 5.--Summary Statistics by Stage of Process
Percentages of 4-digit Industries

Stage of Process	Crude	Primary	Intermediate	Final
Industries	10	27	43	95
Production-oriented (percent)	60	88	45	54
Fully-defined industry (D)	30	23	19	12
Partial process industry (P)	0	27	5	25
Multiple process industry (M)	30	38	21	16
Both partial and multiple processes (PM)	0	0	0	1
No production-oriented basis (percent)	40	12	55	46
Market-oriented (percent)	80	28	62	83
Fully-defined market (D)	20	4	19	36
Partial market (P)	50	12	26	30
Multiple markets (M)	10	12	15	13
Both partial and multiple market (PM)	0	0	2	4
No market-oriented basis (percent)	20	73	38	17
Ideal industries (percent)	20	4	7	9
No conceptual basis, neither production nor market (percent)	10	8	31	15

NOTE: Percentages do not always add to 100 owing to rounding.

Table 6.--Summary Statistics by Stage of Process Percentages by Value of Shipments				
Stage of Process	Crude	Primary	Intermediate	Final
Value of Shipments	31,591	137,423	289,413	606,379
Production-oriented (percent)	43	86	40	21
Fully-defined industry(D)	9	14	17	21
Partial process industry (P)	0	12	4	14
Multiple process industry (M)	34	60	19	36
Both partial and multiple processes (PM)	0	0	0	0
No production-oriented basis (percent)	57	14	60	29
Market-oriented (percent)	90	25	54	92
Fully-defined market (D)	4	3	11	33
Partial market (P)	50	10	19	21
Multiple markets (M)	36	12	22	12
Both partial and multiple market (PM)	0	0	1	26
No market-oriented basis (percent)	9	76	47	7
Ideal industries (percent)	4	3	8	13
No conceptual basis, neither production nor market (percent)	5	12	42	7

NOTE: Percentages do not always add to 100 owing to rounding.

Table 7.--Matrix Analysis of Services: Percentages of Production-Oriented and Market-Oriented Industries				
	Number of industries	Percent	Value of receipts (Millions of dollars)	Percent
Matrix industries in services	**60**	**100**	**329,245**	**100**
Production-oriented	44	73.3	219,181	66.6
Fully-defined industry (D)	13	21.7	45,906	13.9
(Of which: Ideal industry)	(7)	(11.7)	23,743	7.2
Partial process industry (P)	8	13.3	29,510	9.0
Multiple process industry (M)	16	26.7	110,995	33.7
Both partial and multiple processes (PM)	7	11.7	32,770	10.0
No production-oriented basis	16	26.7	110,063	33.4

Matrix industries in services	60	100	329,245	100
Market-oriented	45	75.0	224,208	68.1
Fully-defined market (D)	18	30.0	4,789	1.5
(Of which: Ideal industry)	(7)	(11.7)	23,743	7.2
Partial market (P)	19	31.7	81,953	24.9
Multiple markets (M)	6	10.0	85,150	25.9
Both partial and multiple market (PM)	2	3.3	9,216	2.8
No market-oriented basis	15	25.0	105,037	31.9

Ideal industries	7	11.7	23,743	7.2
No conceptual basis, neither production nor market	13	21.7	86,284	26.2

Table 8.–Services SIC Major Groups: Percentages of 4-digit Production-Oriented and Market-Oriented Industries				
SIC Major Group	72	73	87	Total
Number of 4-digit Industries	15	32	13	60
Production-oriented (percent)	87	81	38	73
Fully-defined industry (D)	7	31	15	22
Partial process industry (P)	13	19	0	13
Multiple process industry (M)	40	22	23	27
Both partial and multiple processes (PM)	27	9	0	12
No production-oriented basis (percent)	13	19	62	27
Market-oriented (percent)	80	88	38	75
Fully-defined market (D)	27	38	15	30
Partial market (P)	40	41	0	32
Multiple markets (M)	7	6	23	10
Both partial and multiple market (PM)	7	3	0	3
No market-oriented basis (percent)	20	13	62	25
Ideal industries (percent)	0	16	15	12
No conceptual basis, neither production nor market (percent)	13	9	62	22

NOTE: Percentages do not always add to 100 owing to rounding.

Table 9.--Services Major Groups: Percentages by Total Receipts				
SIC Major Group	72	73	87	Total
Value of Receipts	31,491,043	166,321,525	131,432,016	329,244,584
Production-oriented (percent)	92	66	61	67
Fully-defined industry (D)	3	20	9	14
Partial process industry (P)	9	16	0	9
Multiple process industry (M)	40	18	52	34
Both partial and multiple processes (PM)	40	12	0	10
No production-oriented basis (percent)	8	34	39	33
Market-oriented (percent)	83	71	61	68
Fully-defined market (D)	21	18	9	15
Partial market (P)	44	41	0	25
Multiple markets (M)	1	10	52	26
Both partial and multiple market (PM)	17	2	0	3
No market-oriented basis (percent)	17	29	39	32
Ideal industries (percent)	0	7	9	7
No conceptual basis, neither production nor market (percent)	8	2	39	17

NOTE: Percentages do not always add to 100 owing to rounding.

APPENDIX A

QUESTIONNAIRE

A. Production-oriented or Supply-based questions

(1) Does the production process uniquely define this industry?

IF YES, ENTER 'D' IN COLUMN 2.

IF NO:

(a) Is the process used in other industries?

IF THE INCLUSION OF THESE OTHER INDUSTRIES, OR PARTS OF THEM, WOULD CHANGE YOUR ANSWER TO (1), ENTER 'P' IN COLUMN 2 AND ENTER THE OTHER INDUSTRIES IN THE NOTES.

(b) Are there two distinct processes in this industry?

IF SPLITTING THIS INDUSTRY INTO 2 OR MORE PARTS WOULD CHANGE YOUR ANSWER TO QUESTION (1), ENTER 'M' IN COLUMN 2, AND INDICATE IN THE NOTES WHAT THE DIVIDED INDUSTRIES MIGHT BE CALLED.

(2) Do the materials used in this industry uniquely define the industry?

IF YES, ENTER 'D' IN COLUMN 3.

IF NO:

(a) Are these materials used in other industries?

IF THE INCLUSION OF THESE OTHER INDUSTRIES, OR PARTS OF THEM, WOULD CHANGE YOUR ANSWER TO (2), ENTER 'P' IN COLUMN 3 AND ENTER THE OTHER INDUSTRIES IN THE NOTES.

(b) Are there two distinct materials in this industry?

IF SPLITTING THIS INDUSTRY INTO 2 OR MORE PARTS WOULD CHANGE YOUR ANSWER TO QUESTION (2), ENTER 'M' IN COLUMN 3, AND INDICATE IN THE NOTES WHAT THE DIVIDED INDUSTRIES MIGHT BE CALLED.

(3) Do the human capital components of the labor force uniquely define this industry?

IF YES, ENTER 'D' IN COLUMN 4.

IF NO:

(a) Are these skills used in other industries?

IF THE INCLUSION OF THESE OTHER INDUSTRIES, OR PARTS OF THEM, WOULD CHANGE YOUR ANSWER TO (3), ENTER 'P' IN COLUMN 4 AND ENTER THE OTHER INDUSTRIES IN THE NOTES.

(b) Are there two distinct labor types in this industry?

IF SPLITTING THIS INDUSTRY INTO 2 OR MORE PARTS WOULD CHANGE YOUR ANSWER TO QUESTION (3), ENTER 'M' IN COLUMN 4, AND INDICATE IN THE NOTES WHAT THE DIVIDED INDUSTRIES MIGHT BE CALLED.

(4) Does a **COMBINATION** of material, labor, and/or process uniquely define this industry?

IF YES, THIS IS A SUPPLY-BASED INDUSTRY. ENTER 'D' IN APPROPRIATE COLUMNS (COULD BE ANY COMBINATION OF 2, 3, AND 4).

B. <u>Market-oriented or Demand-based questions</u>

(1) Are the products of this industry closer substitutes among themselves than anything produced outside the industry?

IF YES, ENTER 'D' IN COLUMN 5.

IF NO:

(a) Would the inclusion of another industry (or several, or part of another) change your answer?

IF YES, ENTER 'P' IN COLUMN 5 AND ENTER THE OTHER INDUSTRIES IN THE NOTES.

(b) Would splitting this industry into two change your answer?

IF YES, ENTER 'M' IN COLUMN 5 AND INDICATE IN THE NOTES WHAT THE DIVIDED INDUSTRIES MIGHT BE CALLED.

(2) Are the products of this industry typically distributed or used together?

IF YES, ENTER 'D' IN COLUMN 6.

IF NO:

(a) Would the inclusion of another industry, or part of an industry, or of several industries or parts of several industries, change your answer?

IF YES, ENTER 'P' IN COLUMN 6 AND ENTER THE OTHER INDUSTRIES IN THE NOTES.

(b) Would splitting this industry into two or more industries change your answer?

IF YES, ENTER 'M' IN COLUMN 6 AND INDICATE IN THE NOTES WHAT THE DIVIDED INDUSTRIES

Appendix B:
Economic Concepts in Selected U.S. SIC Industries

Codes
- D - Defines a conceptually based industry
- M - Multiple processes/markets
- P - Partial, e.g. industry
- V - Vertical integration is part of definition of industry
- N - neither basis

Ind.....Industry
Mkt.....Market
Used/Dist.....Used or distributed together
V.I.....Vertical Integration

SIC	Titles: United States (1987)	IDEAL INDUSTRY	Conceptual Framework: Supply-based: PROCESS	Supply-based: MATERIAL	Supply-based: LABOR	Demand-based: MARKET	Demand-based: USED/DIST	Demand-based: OTHER	NEITHER	COMMENTS
2011	Meat packing plants		DV	DV		P				Some products of 2013 are identical, distinguished by V.I.
2013	Sausages and other prepared meats		DV	DV		P				See 2011. Mkt. category would comb. identical products.
2015	Poultry slaughtering and processing		M	D		M				Would be Mkt & process category if eggs & subst. removed.
2021	Creamery butter	X	D	D		D				A broader Mkt. category may include magarine, fats, & oils.
2022	Cheese, natural and processed					D				
2023	Dry, condensed, evaporated dairy products								N	
2024	Ice cream and frozen desserts	X	D			D				
2026	Fluid milk	X	D			D				A broader Mkt. category may include other beverages.
2032	Canned specialties								N	Only element in common is the canning process.
2033	Canned fruits and vegetables		P	P		PM				A broader mkt. category may include frozen fruits & vegs. Fruits & vegs considered separate mkts. Canning proc. used in other industries. Originally coded D-mat, D-proc, and P-mkt.
2034	Dehydrated fruits, vegetables, soups		M			M				Separating soup mixes would better define this industry.
2035	Pickles, sauces, and salad dressings		M			M				Separating pickling would better define this ind. as to process.
2037	Frozen fruits and vegetables		P	P		PM				See 2033. Also, freezing process used in other inds. Originally coded D-mat, D-proc, and P-mkt.
2038	Frozen specialties, nec								N	Only common element among products is freezing process.
2041	Flour and other grain mill products		DV	DV		M				(Based on A4) V.I. distinguishes from prep mixes of 2045. Could establish several marketing categories.
2043	Cereal breakfast foods					D				
2044	Rice milling	X	D	D		D				On supply side, entries based on question A4.
2045	Prepared flour mixes and doughs		DV	DV		P				If prep mixes of 2041 combined, would be an ideal industry.
2046	Wet corn milling		M			M				Processes are wet corn milling & mfg. starch from veg. sources. All starches could be grouped to make a market category.
2047	Dog and cat food					D				
2048	Prepared feeds, nec					M				If altered for poultry and livestock feed only would be mkt. cat.
2051	Bread, cake, and related products		P			P	P		N	
2052	Cookies and crackers		P			P	P		N	
2053	Frozen bakery products, except bread		P			P	P		N	
2061	Raw cane sugar		DV	DV		P				V.I. distinguishes from 2062.
2062	Cane sugar refining		DV	DV		P				See 2061.

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SIC	Titles United States (1987)	IDEAL INDUSTRY	Conceptual Framework: Supply-based PROCESS	Supply-based MATERIAL	Supply-based LABOR	Demand-based MARKET	Demand-based USED/DIST	Demand-based OTHER	NEITHER	COMMENTS
2063	Beet sugar		D	D		P				
2064	Candy + other confectionery products					P				Partial because of candy in 2066.
2066	Chocolate and cocoa products		M	M						Candy portion could establish a mkt. cat. if comb. with 2064.
2067	Chewing gum					D				As Can pointed out, there is no mat. restriction nor distinct proc.
2068	Salted and roasted nuts and seeds	X	D			D				Might also include in a wider mkt. category called snack foods.
2074	Cottonseed oil mills		P	D		P				Process used in 2075 and 2076 is similar.
2075	Soybean oil mills		P	D		P				See 2074.
2076	Vegetable oil mills, nec		P	D		P				See 2074.
2077	Animal and marine fats and oils		M	M		P				Question as to how many different processes.
2079	Edible fats and oils, nec		M			P				Process is stage beyond what's done in 2074-2076. Corn oil not included in market.
2082	Malt beverages	X	D			D				
2083	Malt	X	D			D				
2084	Wines, brandy, and brandy spirits		M	M		M				Notes several processes & mats. Could be D's on supply. U.S. ind includes brandy, Canada's doesn't. We believe brandy included here since made by wine mfgs. 87 Cen. data supports.
2085	Distilled and blended liquors		M			D				Distilling and blending or mixing are the two processes.
2086	Bottled and canned soft drinks					D				
2087	Flavoring extracts and syrups, nec								N	
2091	Canned and cured fish and seafoods		M	P		P				Combination of 2092 would distinguish a market category.
2092	Fresh or frozen prepared fish		M	P		P				See 2091.
2095	Roasted coffee		M	M		P				Partial market because of wholesale and retail roasters.
2096	Potato chips and similar snacks		P			D				Pretzels and nuts might be included in a broader mkt. category. Process is oil-based frying which occurs in other industries.
2097	Manufactured ice	X	D	D		D				
2098	Macaroni and spaghetti	X	D			D				Can. questions whether the process(es) and market are distinct. It appears our mkt. is because fresh pasta incl. (per numeric list). However, are the processes for making dry and fresh pasta diff
2099	Food preparations, nec								N	
2311	Men's and boys' suits and coats		P	P		P	P			P (proc) distinquishes the vertically integrated plants of mg 22. P (mat), same mats used in mg 22 and others, especially mg 23.

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SIC	Titles United States (1987)	IDEAL INDUSTRY	Conceptual Framework: Supply-based PROCESS	Supply-based MATERIAL	Supply-based LABOR	Demand-based MARKET	Demand-based USED/DIST	Demand-based OTHER	NEITHER	COMMENTS
										(Proc could be viewed as a "M" because the ind. incl. cut & sew, jobbers, and regular factories.)
2321	Men's and boys' shirts		P	P		P	P			See 2311.
2322	Men's + boys' underwear + nightwear		P	P		P	P			See 2311.
2323	Men's and boys' neckwear		P	P		P	P			See 2311.
2325	Men's and boys' trousers and slacks		P	P		P	P			See 2311.
2326	Men's and boys' work clothing		P	P		D	D			See 2311.
2329	Men's and boys' clothing, nec								N	
2331	Women's + misses' blouses + shirts		P	P		P	P			See 2311.
2335	Women's, junior's, + misses' dresses		P	P		P	P			See 2311.
2337	Women's and misses' suits and coats		P	P		P	P			See 2311.
2339	Women's and misses' outerwear, nec								N	
2341	Women's and children's underwear		P	P		P	P			See 2311.
2342	Bras, girdles, and allied garments		P	P		D	D			See 2311. (Can questions our use of M-proc. Explained because cut & sew, & jobbers. Can-distinction made at mg level. unresolv
2353	Hats, caps, and millinery			P		P				Many different processes in making straw, felt, knit hats.
2361	Girls' + children's dresses, blouses		P	P		P	P			See 2311.
2369	Girls' and children's outerwear, nec								N	
2371	Fur goods		D	D		P				Mkt originally coded . We agreed with Can that coats of 2337 and elsewhere are substitutes, especially in terms of warmth .
2381	Fabric dress and work gloves					P				Gloves also in MG's 22, 30, 31.
2384	Robes and dressing gowns		P	P		P				See 2311.
2385	Waterproof outerwear		M							
2386	Leather and sheep-lined clothing		P	P						Similar processes used elsewhere.
2387	Apparel belts					D				
2389	Apparel and accessories, nec								N	
2391	Curtains and draperies		P	P		P				
2392	Housefurnishings						P			
2393	Textile bags					P				Substitutes elsewhere.
2394	Canvas and related products			p						Canvas also used in mg 31 for casual and athletic shoes.
2395	Pleating and stitching								N	

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2396	Automotive and apparel trimmings								N	
2397	Schiffli machine embroideries								N	
2399	Fabricated textile products, nec								N	
3312	Blast furnaces and steel mills		M							Coke process and steel making process could be separated.
3313	Electrometallurgical products	X	D	D		D				Follows Canadian lead. No other knowledge at present. (Canada willing to accept D-proc for their industry.)
3315	Steel wire and related products		MV	MV						One level of V.I. distinguished between 3312. Within 3315 other processes could be distinguished.
3316	Cold finishing of steel shapes		MV	MV						Same as 3315, exc. within 3316 other procesesses could be distinguished.
3317	Steel pipe and tubes		MV	DV		P				Broader mkt. cat. may include identical prods. of 3312. Also, same as 3315, exc. in 3317 other procs. could be distinguished.
3321	Gray and ductile iron foundries		D	D						A broader process cat. would combine with 3322, as Canada.
3322	Malleable iron foundries		D	D						See 3321.
3324	Steel investment foundries		D	P						A broader process cat. would combine with 3325, as Canada. Materials assumed the same as 3325.
3325	Steel foundries		D	P						See 3324.
3331	Primary copper		M	M		P				M (proc) refers to processes within the industry. (P Mkt added as result of 11/4 mtg. Same products produced in 3341)
3334	Primary aluminum		M	M		P				See 3331. P (mkt) because same products also made in 3341.
3339	Primary nonferrous metals, nec		M	M		P				M (proc) refers to processes for different types of metals. (P mkt added as a result of 11/4 mtg. Same prods in 3341.
3341	Secondary nonferrous metals					PM				(Originally coded as neither basis.) P mkt added as a result of 11/4 mtg. Same products in 3331,4, and 9.
3351	Copper rolling and drawing		M	D						Could be split apart based on different processes.
3353	Aluminum sheet, plate, and foil		M	D						Welded tubes are further fabricated (step after rolling). 2 procs.
3354	Aluminum extruded products		D	D						
3355	Aluminum rolling and drawing		M	D						Notes several distinguishable processes. Not viewed as nec. ind.
3356	Nonferrous rolling and drawing, nec		M							Notes several distinguishable processes.
3357	Nonferrous wiredrawing + insulating		M							If process system, separate industries could be established.
3363	Aluminum die-castings		P	D						If casting process is determined to be diff., then process is "M."

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3364	Nonferrous die-casting exc. aluminum		P	M						See 3363
3365	Aluminum foundries		P	D						If casting process is determined to be diff., then process is "M."
3366	Copper foundries		P	D						See 3365.
3369	Nonferrous foundries, nec		P	M						See 3365.
3398	Metal heat treating		D							
3399	Primary metal products, nec								N	
3511	Turbines and turbine generator sets		M			M				Need more information, seems quite diverse.
3519	Internal combustion engines, nec		P			P				P (proc) notes similar engines built elsewhere (mg 37). Aircraft & automotive engines, other than diesel, historically separated.
3523	Farm machinery and equipment						D			
3524	Lawn and garden equipment						D			
3531	Construction machinery						D			
3532	Mining machinery						D			
3533	Oil and gas field machinery						D			
3534	Elevators and moving stairways					D				Similar to 3535, but moves people.
3535	Conveyors and conveying equipment					D				Similar to 3534, but moves objects.
3536	Hoists, cranes, and monorails					D				Similar to 3534, 5, but moves objects generally overhead.
3537	Industrial trucks and tractors								N	
3541	Machine tools, metal cutting types		M				D			Many diverse procs. to cut & remove metal. Used in mach shops.
3542	Machine tools, metal forming types		M				D			Many diverse procs. to shape metal. Used in machine shops.
3543	Industrial patterns		D			D				Not quite sure. Additional information needed.
3544	Special dies, tools, jigs + fixtures		M		M	M				Tool & die shops could have labor, market, process separated for an ideal industry.
3545	Machine tool accessories						M			Generally used together. Used in 3541, 2 and possibly 3553.
3546	Power-driven handtools						M			Not sure how to treat.
3547	Rolling mill machinery						D			
3548	Welding apparatus		M				D			Some things here do not seem to belong (welding wire, robots).
3549	Metalworking machinery, nec								N	
3552	Textile machinery						D			
3553	Woodworking machinery						M			For example, equip. for sawmills could be separated from equip. for woodworkers and furn. mfrs. Some mach. in 3559 (lumber

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										drying kilns)
3554	Paper industries machinery						M			E.G., could sep. pulp/paper mach. from paper products mach.
3555	Printing trades machinery						D			
3556	Food products machinery								N	Commercial & industrial food proc. mach. of many diff. types.
3559	Special industry machinery, nec								N	
3561	Pumps and pumping equipment					PM				Pumps for many applications here. Pumps elsewhere e.g., 37.
3562	Ball and roller bearings	X	D			D				For some applications, plain bearings (3568) may be a close substitute.
3563	Air and gas compressors								N	Too broad, title should be compressors, spraying, dusting, and painting equipment
3564	Blowers and fans					M				Mkts are fans & blowers, and air purification equip.
3565	Packaging machinery								N	Packaging machinery of many different types.
3566	Speed changers, drives, and gears					P				Power transmission equip also in 3568. Other products in in 3052 and mg 37.
3567	Industrial furnaces and ovens		P			PM				Some ovens are placed elsewhere, e.g., 3556, 3559.
3568	Power transmission equipment								N	
3569	General industrial machinery, nec								N	
3571	Electronic computers	X	D			D				Candidate for dividing into add'l process/mkt categories
3572	Computer storage devices		M			D				
3575	Computer terminals					D				
3577	Computer peripheral equipment						D			ADP users/uses, SIC's 3572 & 3575 are other complements
3578	Calculating and accounting equipment								N	
3579	Office machines, nec								N	
3581	Automatic vending machines		M			M				On Process side, one essential element is coin-operating mechanisms; markets range from fare cards to refrigerated soft drink dispensers.
3582	Commercial laundry equipment		PM				P			Coin operated washers/dryers of 3633 also used commercially.
3585	Refrigeration and heating equipment								N	Products used in many different markets. For example, includes car air-conditioning & snow making equipment.
3586	Measuring and dispensing pumps		M				D			Intended for the same market (service stations). If grease guns were moved elsewhere; gas pumps would be an ideal industry.

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3589	Service industry machinery, nec								N	
3592	Carburetors, pistons, rings, valves								N	
3593	Fluid power cylinders + actuators					D				
3594	Fluid power pumps and motors					D				
3596	Scales and balances, exc. laboratory								N	
3599	Industrial machinery, nec								N	
3711	Motor vehicles and car bodies		M			PM				M (mkt) reflects several mkts. within 3711 and P (mkt) distinguishes between 3713. (Because of differences in treatment we agreed to let coding remain the same for both)
3713	Truck and bus bodies		MV			P				3713 distinction made partly on V.I. Processes are body bldg. and assembly, and assembly without manufacturing bodies. (See parenthetical comment for 3711.)
3714	Motor vehicle parts and accessories								N	No distinct market or processes.
3715	Truck trailers	X	D			D				Agreed to some changes originally, but because of a letter from industry assoc. stating they were supply, we will not change.
3716	Motor homes		PV			P				Similar process on trailers in 3715.
3721	Aircraft		M			M				If wanted, separate industries could be established for dirigibles, helicopters, jet, and defense aircraft.
3724	Aircraft engines and engine parts					M				If 3721 divided, 3724 and 3728 could be split the same.
3728	Aircraft parts and equipment, nec					M				See 3724.
3731	Ship building and repairing		M			M				Narrower process distinction could create new industries. (Canada agrees with us.)
3732	Boat building and repairing					M				We agreed with Can., since we felt the procs. too varied to flag. Originally coded an "M" uder Proc.
3743	Railroad equipment					M				Could split market among rail, subway, and freight.
3751	Motorcycles, bicycles, and parts					M				Could separate bicycles from motorcycles.
3761	Guided missiles and space vehicles	X	D			D				
3764	Space propulsion units and parts					D				Products of industry are used only by 3761.
3769	Space vehicle equipment, nec					D				See 3764.
3792	Travel trailers and campers		P			P				P's relate to 3716.
3795	Tanks and tank components					D				

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3799	Transportation equipment, nec								N	
7211	Power laundries, family + commercial		P			P				Shares similar process and market as 7213 and 7218.
7212	Garment pressing + cleaners' agents		M			P				Many procs, e.g., truck routes, valet. Same market as 7211.
7213	Linen supply		PM			D				M (proc) refers to operating\not operating own facilities. P (proc) refers to 7211.
7215	Coin-operated laundries and cleaning		M			D				Processes are operating on own vs other premises.
7216	Drycleaning plants, except rug		M			P				Processes are drycleaning, dyeing. Shares market with 7212.
7217	Carpet and upholstery cleaning		M			D				Processes are carpet\upholstery cleaning at own plant or at customers premises.
7218	Industrial launderers		PM							Procs within are rental of goods laundered vs. not in same plant; and laundering customer's good. P (proc) because of 7211.
7219	Laundry and garment services, nec								N	
7221	Photographic studios, portrait		P		P	D				P (proc) because 7335 uses the same.
7231	Beauty shops		PM			P				M (proc) because of manicure, facial, etc. and schools. P (proc) and P (mkt) because of 7241.
7241	Barber shops		PM			P				See 7231.
7251	Shoe repair and shoeshine parlors		M			M				Many diff. processes and they serve many markets.
7261	Funeral service and crematories		M			PM				M (proc)--crematories, funeral homes. P (mkt)--crematories compete with cemeteries of 6553.
7291	Tax return preparation services		D			P				P (mkt) because accountants and lawyers do same.
7299	Miscellaneous personal services, nec								N	
7311	Advertising agencies		D		D	P				Consider moving part of 8748, sales promo advice and media buying service of 7319 here to create ideal industry.
7312	Outdoor advertising services		D			P				P (mkt) because substitutes elsewhere especially 7319.
7313	Radio, TV, publisher representatives		D			P				Recognizes owned establishments of radio, TV perform same. (Agreed with Can. that Proc coded "D". Proc not coded earlier. Didn't consider other aux estabs doing act. primary elsewhere)
7319	Advertising, nec		M			P				See 7312. Could split into many processes. (GI suggest split of media buying to own ind.) Media buying competes with 7311.
7322	Adjustment + collection services		PM			D				"P" proc--skiptracing done by detective agencies. "M" proc refers to skiptracing, adjustment services, debt collection. (Orig ideal)

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7323	Credit reporting services		P			D				Process (on-line retrieval) shared with other specialized on-line services classified elsewhere. (Only change was to note.)
7331	Direct mail advertising services		M			P				P (mkt) because of 7312 and 7319.
7334	Photocopying + duplicating services					P				P (mkt) since materials may be printed. (Agreed to keep as is)
7335	Commercial photography		P		P	D				P (proc) because 7221 uses same.
7336	Commercial art and graphic design		M		P	D				
7338	Secretarial + court reporting		M			D				Processes include resume writing.
7342	Disinfecting + pest control services		M			M				Some activities possibly could be split or moved to 7349.
7349	Building maintenance services		M			P				Similar services performed in 7342.
7352	Medical equipment rental	X		D		D				Questions ideal ind. because of 1st occurence of this combo.
7353	Heavy construction equipment rental	X		D		D				See 7352.
7359	Equipment rental + leasing, nec								N	
7361	Employment agencies		PM			P				P, mkt & proc, because of 7819 &7922. M (Proc) because registries operate differently from employment agencies
7363	Help supply services									Much discussion, no decisions.
7371	Computer programming services		P		P	P				Discussion blurred distinc. between 7371 & 7372. Not certain.
7372	Prepackaged software		P		P	P				See 7371. Not sure where reproduction of software only is. (Data on reprod. of software collected in 7379--JMoody 10/7)
7373	Computer integrated systems design		D		P	P				Part of both labor and market elsewhere, but especially 7379.
7374	Data processing and preparation		PM			M				M (proc)--data entry vs. leasing of computer time. P (proc)--activities performed here on site also performed in 7376.
7375	Information retrieval services		D			P				Changed because of 7323. This ind. provides general data.
7376	Computer facilities management		P			D				See 7374.
7377	Computer rental , leasing	X		D		D				
7378	Computer maintenance + repair					D				(Originally coded "D" labor. SIC def. has no labor requirement.)
7379	Computer related services, nec								N	
7381	Detective + armored car services		M			P				If better market category desired, could combine with 7382.
7382	Security systems services		P			P				P (proc) indicates medical monitoring performed elsewhere.
7383	News syndicates	X	D			D				
7384	Photofinishing laboratories	X	D			D				
7389	Business services, nec								N	

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8711	Engineering services				M	M				Could separate by engineering specialty, and by markets (Both will keep coding as is, Can. estabs not as specialized)
8712	Architectural services	X			D	D				Skills (Canada agrees with U.S.)
8713	Surveying services				M	M				Unclear about range of activities, might split or recombine
8721	Accounting, auditing, + bookkeeping				M	M				2 distinct areas: a) CPA/auditing, b) bookkeeping/ payroll/billing
8731	Commercial physical research								N	Ind has many expertises; distinction between commercial/non-commer'l not meaningful, distinc. between eng labs/serv unclear
8732	Commercial nonphysical research								N	3 diff skills; distinct between commer'l/non not meaningful
8733	Noncommercial research organizations								N	Multi skills, distinction between commer'l/non-commer'l not meaningful.
8734	Testing laboratories								N	Nothing in common except the word test.
8741	Management services								N	Little in common except the word "management."
8742	Management consulting services								N	Multiple services and markets
8743	Public relations services	X			D	D				Some activities overlap with advertising
8744	Facilities support services								N	Except for jails, services are misc.
8748	Business consulting, nec								N	

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	Titles	N	P	M						
		O	R	T		M	D		E	
		U	O	E	L	A	/	O	I	
		S	C	R	A	R	D	T	T	
		T	E	I	B	K	I	H	H	
		R	S	A	O	E	S	E	E	
8721	Engineering services				M	M				Could separate by engineering specialty, and by markets
8712	Architectural services	X			D	D				(Both will keep coding as is. Can, estate not as specialized)
8713	Surveying services				M	M				Mkts (Canada access with U.S.)
8721	Accounting, auditing, + bookkeeping				M	M				Undist about range of activities, might split or reconsider
8731	Commercial physical research								N	(e.g. defines areas; a) CPA/auditing, b) bookkeeping/ payroll billing
8732	Commercial nonphysical research								N	but has many exceptions; distinction between commercial/non-commercial not meaningful, define between one industry
8733	Noncommercial research organizations								N	is old table; distinct between commercial/non-commercial not meaningful
8734	Testing laboratories								N	Multi table, distinction between commercial/non-commercial not meaningful.
8741	Management services								N	Overlap in common except the word "set"
8742	Management consulting services								N	Little in common except the word "management"
8743	Public relations services	X			D	D				Multiple services and markets
8744	Facilities support services								N	Some activities overlap with advertising
8748	Business consulting, nec								N	Except for data, services are misc.