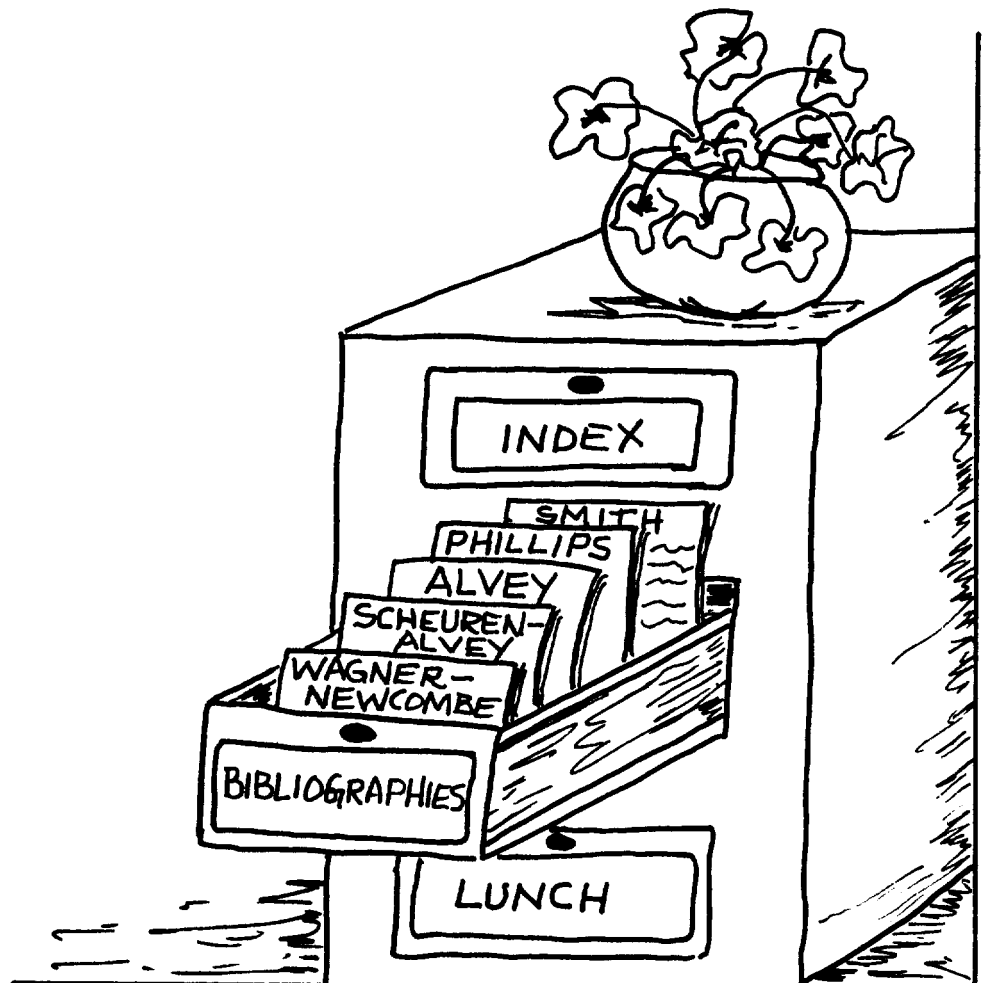


Appendix A: Selected Bibliographies of Exact Matching Methodologies and Applications



UPDATED BIBLIOGRAPHY OF WORK ON EXACT MATCHING

Compiled through 1985 by
Wendy Alvey, Internal Revenue Service

This bibliography is one of the products which grew out of the Workshop on Exact Matching Methodologies, held in Arlington, Virginia, May 9-10, 1985. It draws on references from papers presented and suggested citations provided by participants who attended that conference. The aim was to round out the other bibliographic materials on matching included here, making them more current and filling in some of the historical gaps. The starting place for the effort was an earlier collection, which focused on U.S. linkage techniques during the period 1950-1974:

Scheuren, Fritz and Alvey, Wendy. (1974) "Selected Bibliography on the Matching of Person Records from Different Sources," Proceedings of the American Statistical Association, Social Statistics Section, pp. 151-154 (pp. 347-356 in this volume).

SCOPE AND LIMITATIONS

The primary emphasis of the present bibliography is on major methodological developments and applications involving exact matching during the past eleven years. Many of the citations document recent linkage efforts involving matches of administrative and survey records for statistical purposes. The references are believed to be less complete in other areas, especially in epidemiological applications. For citations in that area, see:

Wagner, G. and Newcombe, H.B. (1970) "Record Linkage: Its Methodology and Application in Medical Data Processing," Methods of Information in Medicine, vol. 9, no. 2, pp. 121-138 (pp. 357-374 in this volume).

While this bibliography concentrates on matches of individuals, some establishment studies are referenced, as well. However, time constraints prevented us from covering this area completely. For documentation of some of the earlier literature pertaining to matching of businesses see:

Phillips, Bruce D. (1985) "The Development of the Small Business Data Base of the U.S. Small Business Administration: A Working Bibliography," Record Linkage Techniques--1985, Internal Revenue Service, pp. 375-379 (in this volume).

It is important to note that the present bibliography deals only tangentially with the confidentiality and disclosure issues which are so vital a part of many matching studies. In particular, just some of the more important recent references are cited. Two excellent bibliographies on privacy and confidentiality are:

Flaherty, David H.; Hanis, Edward H.; and Mitchell, S. Paula. (1979) Privacy and Access to Government Data for Research: An International Bibliography, Mansell Publications, London, U.K; and

Flaherty, David H. (1985) Privacy and Data Protection: An International Bibliography, Knowledge Industry Publications, Inc., White Plains, N.Y.

See also:

U.S. Department of Commerce, Office of Federal Statistical Policy and Standards. (1978) Report on Statistical Disclosure and Disclosure Avoidance Techniques, Statistical Policy Working Paper 2, Government Printing Office, Washington, D.C.

Further, it should also be pointed out that no attempt has been made to cover the literature on synthetic or statistical matching. For a summary of the recent work in this area, see:

Paass, Gerhard. (1985) "Statistical Record Linkage Methodology," a paper presented at the 45th Meeting of the International Statistical Institute, Amsterdam, August 1985;

Rodgers, Willard. (1984) "An Evaluation of Statistical Matching," Journal of Business and Economic Statistics, American Statistical Association, vol. 2, no. 1, pp. 91-102; and

Rubin, Donald. (1986) "Statistical Matching Using File Concatenation with Adjusted Weights and Multiple Imputation," Journal of Business and Economic Statistics, American Statistical Association, vol. 4, no. 1, pp. 87-94.

Finally, for a bibliography which focuses mainly on issues only indirectly related to exact matching, see also:

Smith, Wray. (1985) "Bibliography of Methodological Techniques Related to Exact Matching," Record Linkage Techniques--1985, Internal Revenue Service, pp. 381-382 (in this volume).

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Compiled through 1974 by
Fritz Scheuren and Wendy Alvey, Social Security Administration

The references listed here are restricted essentially to published information on the results and methodology of matching person records. No material relating to establishment matching is included. Several compilations of articles exist on the confidentiality issues raised by record linkages. As a rule, therefore, we have excluded these citations from the bibliography. Two recent such compilations are:

Report of the President's Commission on Federal Statistics, vol. 1, 1971, pp. 246-254.

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Some other limitations should also be mentioned:

1. The listing does not contain citations to studies which began with an administrative record and then drew a sample of cases to be interviewed. (Excluded from the bibliography, therefore, are basically all *reverse* record check studies of financial characteristics, as well as *prospective* epidemiological studies.)
2. Only references to "exact" matching are included. Synthetic or "statistical" matching studies are not shown. (For citations to the literature on synthetic matches, see Radner, D. B. *The Statistical Matching of Microdata Sets: the Bureau of Economic Analysis 1964 Current Population Survey--Tax Model Match*, Yale Univ., New Haven, 1974. See also the *Annals of Economic and Social Measurement*, vol. 3, 1974, where several articles on synthetic matching are presented.)
3. Studies of matching for use in Dual System Estimation are also not included. For a recently published source of information in this area, see Marks, E.S.,

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COMPLETENESS OF COVERAGE

The bibliography's coverage of major U. S. studies involving linkages between survey (or census) schedules and administrative records is believed to be reasonably complete for the period 1950-1974. However, only a few references are given to work done outside the United States and to research engaged in before 1950.

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Record Linkage

Its Methodology and Application in Medical Data Processing*

A bibliography compiled by
G. WAGNER and H. B. NEWCOMBE

For the further development of medical data processing the method of record linkage is of utmost importance. It is obvious that two or more items of information about persons or person-groups, recorded at different times and at different places, are of much greater significance when available together than when isolated from each other and inaccessible at the same time. The process of linking together information of medical interest pertaining to the same person is called Medical Record Linkage. Today the linkage procedure can be profitably carried out automatically by computers.

Within the last decade a fast growing literature on this subject has been published, so that it has become more and more difficult for the individual scientist to keep abreast with the wealth of publications.

The references given here have been grouped according to the following topics:

- A. General Remarks on Record Linkage
- B. Methodology of Record Linkage

- C. The Identification Problem
- D. The Privacy Problem
- E. Application of Medical Record Linkage in
 - 1. Patient Care and Medical Data Processing
 - 2. Epidemiology
 - 3. Vital Statistics, Demography
 - 4. Genetics
 - 5. Public Health Services
 - 6. Other and Non-medical Fields
- F. Costs of Record Linkage.

We hope that this bibliography will be of some help for more detailed studies in this important field of medical data processing.

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THE DEVELOPMENT OF THE SMALL BUSINESS DATA BASE
OF THE U.S. SMALL BUSINESS ADMINISTRATION: A WORKING BIBLIOGRAPHY

Compiled through 1985 by
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The Small Business Data Base (SBDB) is an integrated effort for developing and organizing data on the role of small business in the U.S. economy. It is designed to serve two purposes: (1) to comply with the mandate of the Congress and (2) to meet the needs of the research community for analyzing cause and effect relationships of small business problems and progress. Because of the diversity of small business, no one file or collection of statistics is adequate to meet those needs.

The Congressional mandate as stated in Public Law 96-302 instructs the Office of Advocacy of the Small Business Administration to develop a data base to be used for historical description and policy analysis. The specifics of the law are divided into two parts: the "indicative" data base for creating mailing lists and the "external" data base for descriptive statistics and policy analysis.

The SBDB effort is unique because it stresses maximum use of business microdata, the files of individual firms. Therefore, the file provides information of the "indicative" data base and overcomes the problem of non-comparability of longitudinal data for firms of small and large size classes, as well as other major difficulties of establishing the "external" data base.

The "indicative" data base is the Master Establishment List (MEL) of more than 8.9 million 1984 establishment records. It provides the names, addresses and industry and geographic codes for 3.4 million establishments, and adds employment, sales, age of firm and enterprise linkage for an additional 5.5 million firms and establishments. The 1984 MEL, with information current as of January 1, 1985, will be completed November 30, 1985.

The "external" data base is based upon proprietary files of the Dun and Bradstreet Corporation. The USEEM (United States Establishment and Enterprise Microdata) files are cross-sectional files of about 5 million records each for 1976, 1978, 1980, and 1982. (The 1984 files will be available during the Spring of 1986.) The USELM (United States Establishment Longitudinal Microdata) files are longitudinally linked files covering the same years as the USEEM files. However, USELM files are based on a representative weighted sample of verified and linked establishment records which have been edited for consistency over time. The USELM is an approximate 50 percent of the USEEM files.

There are three methods of accessing data in the Small Business Data Base: by obtaining aggregate data which has been published in summary form, by purchasing detailed data at the U.S. or sub-state levels, and by ordering a customized tabulation on a cost reimbursable basis from the Data Base Branch of the Office of Advocacy (202-634-7550).

The papers in the enclosed bibliography provide a record of the progress to date in the development of the Small Business Data Base including details on increasing the access to it. Both methodological and applications papers are included in the hope that persons interested in small business research will consult both the enclosed studies for reference, as well as design new research applications in areas of importance to the small business community.

INTRODUCTION

The studies below describe the creation, documentation, and applications of the Small Business Data Base of the Office of Advocacy of the U.S. Small Business Administration. The lists below, while comprehensive, examine only the most relevant studies during the years 1980-1985; the bibliography is therefore representative but not necessarily exhaustive. The studies below do, however, provide a recent chronological history on the development of the Small Business Data Base, and examples of some applications using the available data.

Two types of studies have generally been included. First, one collection of papers describes the detailed creation of the three major files of the Small Business Data Base: the USEEM (United States Establishment and Enterprise Microdata) file, the MEL (Master Establishment List), and the USELM (United States Establishment Microdata file). These files contain approximately 5 million, 8 million, and 20 million records, respectively, and their development is described in the papers in this bibliography.

In general, the USEEM file is available on both an enterprise and establishment basis by size class, while the MEL includes USEEM, plus an additional 3 million businesses appearing in yellow page type commercial listings. The MEL is only an establishment file. The USELM file is available for establishments only (by enterprise size class). Both USEEM and USELM files are available for 1976, 1978, 1980, and 1982. (The 1984 files will be available during the Spring of 1986.) The MEL file for 1984 (with data current as of January 1, 1985) will be available on November 30, 1985.

The second group of studies detailed in this bibliography are research applications either using the data files directly, or comparing them with other government data sources, such as from the Bureau of the Census, the Internal Revenue Service, or the Bureau of Labor Statistics. The papers contained in these sections are both by staff members of the Office of Economic Research, as well as by SBA contractors.

It is hoped that the source materials listed below will be periodically expanded and updated

as new contracts are completed, and as additional years of data become available. For example, some of the papers in the section describing the Dun and Bradstreet Financial Statistics File are quite preliminary, and are the result of previous attempts to assess the overall quality of the data on an industry specific basis. Ongoing contracts are creating a financial encyclopedia out of this source on an aggregate basis. In still other ongoing research, the development of a longitudinal enterprise file, using the USEEM database, is expected to be completed during the Spring of 1986 for the years 1976-1984. Finally, several papers from ongoing interagency agreements between SBA and other agencies, particularly the Internal Revenue Service, are described which are augmenting the Small Business Data Base.

I. 1984/1985

A. Methodological Papers and File Descriptions

Richard Boden and Bruce D. Phillips, "Uses and Limitations of USEEM/USELM Data." Office of Advocacy, U.S. Small Business Administration, October 1985.

C.D. Day, "1979 Corporation, Partnership and Sole Proprietorship Employment and Payroll Studies: An Initial Look at the Relative Efficiency of Small and Large Business." Prepared under an Interagency Agreement between the Statistics of Income Division, Internal Revenue Service, U.S. Department of the Treasury, and the U.S. Small Business Administration, Office of Advocacy, draft October 1985. (This project entailed a match of SOI files with employment enhancements.)

Nick Greenia, "1979 Sole Proprietorship Employment and Payroll: Processing Methodology," Record Linkage Techniques--1985, Internal Revenue Service, 1985. Prepared under an interagency agreement with the Office of Advocacy, U.S. Small Business Administration.

Lou Jacobsen, "Analysis of the Accuracy of SBA's Small Business Data Base." Prepared by the Hudson Institute of the Center for Naval Analysis under contract to the Office of Advocacy of the U.S. Small Business Administration, August 1985. (This was a matching study between UI and SBDB data.)

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Faith Ando, "Distribution of Business Loans, Credit and Investment Capital to Selected Sub-Categories of Small Business." Final report expected November 1985. Prepared by the JACA Corporation for the Office of Advocacy of the U.S. Small Business Administration under contract 6061-OA-82.

Aram Research Associates, "Informal Investor Survey in the Eastern Great Lakes." In preparation for the Office of Advocacy of the U.S. Small Business Administration under contract number SBA-7187-OA-83. Final report expected December 1985.

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