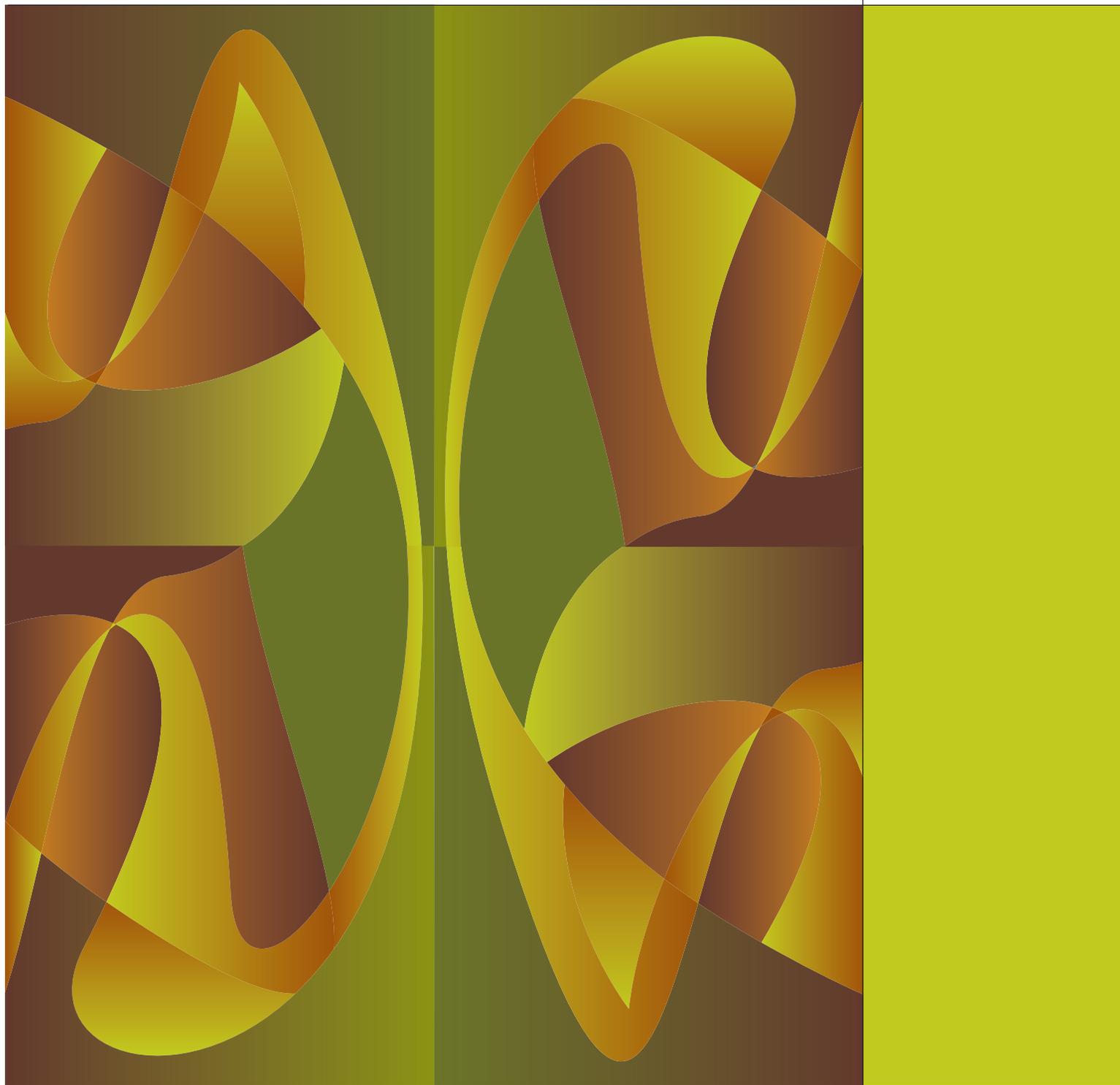


# Research at the Center for Economic Studies and the Research Data Centers: 2006

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**RESEARCH AT THE  
CENTER FOR ECONOMIC STUDIES  
AND THE RESEARCH DATA CENTERS: 2006**

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## A MESSAGE FROM DANIEL WEINBERG, PH.D.

Chief of the Center for Economic Studies and Chief Economist

In 2006, we put the results of Center for Economic Studies (CES) and Research Data Center (RDC) research to work supporting U.S. Census Bureau data collections. One example is our contributions to preparations for the 2007 Economic Census. Our key efforts supporting data collections this past year were (1) the redesign of the Survey of Industrial Research and Development (SIRD), carried out for the National Science Foundation (NSF); (2) activities related to the Pollution Abatement Costs and Expenditures (PACE) survey, carried out for the U.S. Environmental Protection Agency (EPA); and (3) research comparing the business lists used as sampling frames for the Census Bureau and the U.S. Bureau of Labor Statistics (BLS).

Our primary work on the SIRD analyzed how the survey assigns industry codes and edits data. As part of the extensive SIRD redesign effort underway, we worked in close consultation with SIRD and NSF staff to improve SIRD procedures and its sampling frame. We project that implementing our proposed changes could significantly streamline survey processing.

At the request of EPA, a staff member helped to develop editing and imputation methodology for the redesigned 2005 PACE. Because the structure, content, and processing of the 2005 PACE is different from previous PACE surveys, these methodologies had

to be developed from scratch. Assisting in these efforts were a number of present and past RDC researchers with extensive knowledge of the historical PACE microdata. These same CES staff and research associates were also deeply involved in the recently completed redevelopment and evaluation of the PACE survey. We think these are excellent examples and uses of the intellectual capital fostered by the Census Bureau through CES and its RDC program. Chapter 2 discusses in more detail recent developments with the PACE survey.

Census Bureau and BLS staff have continued work comparing the two business lists used by the agencies, the Census Bureau's Business Register (BR) and BLS's Business Establishment List (BEL). These business lists serve a number of functions, including providing a frame from which surveys and samples are drawn and providing the data for published tabulations of business activity (the Census Bureau's *County Business Patterns* and BLS's *Employment and Wages Annual Averages*). While aggregate, published, payroll figures from the two lists are close and track each other well over time, two other measures differ substantially—employment is higher for the BR and the number of establishments is higher for the BEL, and these differences grow over time. Preliminary results for the comparison of the microdata for the reference year 2001 show that 93 percent of employment in

either list is in a business unit that appears on both lists. For units that can be matched across the two lists and that meet both agencies' coverage rules, payroll and employment match closely in 77 and 69 percent of units, respectively. Current research focuses on the comparison for 2003, since the more recent BR reflects changes found by the 2002 Economic Census.

One particularly notable staff product was B.K. Atrostic's paper on "Measuring U.S. Innovative Activity". Originally prepared for an NSF workshop on measuring innovation, the paper presents the CES and RDC research findings relevant to such measurements. A revised and expanded version was recently provided to the just-established U.S. Commerce Secretary's *Advisory Committee on Measuring Innovation in the 21st Century Economy*. This paper is summarized in Chapter 4 and is a new CES Discussion Paper.

We are also very proud of CES contributions to the organization and the content of the seventh conference focusing on Comparative Analysis of Enterprise (Micro) Data, co-sponsored with the Federal Reserve Bank of Chicago and the Organization for Economic Cooperation and Development. The key CES contributor to its success, Shawn Klimek, describes the conference in Chapter 3. (Lynn Riggs was another staff member making a

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major contribution to the conference's success.)

Three developments in 2006 strengthened and expanded the RDC system. First, the Census Bureau Director issued a memorandum acknowledging the value of research in improving Census Bureau surveys (U.S. Census Bureau 2007). This memorandum specifically mentions the value of outside research done at the RDCs. Since it was issued, the timeliness of Internal Revenue Service review of proposed projects involving tax data has improved markedly. Second, the Census Bureau reached agreement with the National Center for Health Statistics (NCHS) to supplement the NCHS RDC in Hyattsville, Maryland, offering access to confidential NCHS data at all Census Bureau RDCs. This development will benefit both our RDC partner institutions and NCHS. Offering access to confidential NCHS data will improve the financial viability of the RDCs at our partner institutions by increasing the number of active researchers. It will also increase use of the NCHS datasets, thereby providing more value than had been possible from the NCHS microdata. Third, we have selected a Lead RDC Administrator, Lynn Riggs, who will be responsible for coordinating the work of the other RDC administrators and for documenting and systematizing procedures.

I want to congratulate two staff members for recent public recognition of their accomplishments. Ron Jarmin, CES Director of Research, received the Census Bureau's highest honor,

a Bronze Medal, for his contributions to CES—in particular, the creation of the Longitudinal Business Database. Randy Becker, a CES senior economist, also received a Bronze Medal, this time from EPA, for his contributions to the redesign of the PACE survey that is described in Chapter 2.

In 2006, over 40 publications resulted from CES and RDC research in 2006. These publications are listed in Appendix 1, together with other working papers (research may be listed simultaneously in the working paper series of other institutions) and presentations.

We welcome the 27 new RDC projects that started in 2006. There is a clear trend toward longer projects that each involves more researchers. Abstracts of those projects are listed in Appendix 2. We encourage current and potential researchers to consider new projects, using the proposal development tools and possible research topics posted on our Web site <[www.ces.census.gov/](http://www.ces.census.gov/)>. Interested researchers should contact the RDC administrator at the site where they propose conducting their research.

In 2006, research at CES and the RDCs led to three new Ph.D. dissertations. Researchers who begin their careers using Census Bureau microdata immediately add to the community of researchers actively using, critiquing, and improving that data. If these new researchers continue to use that data, they potentially provide benefits to the Census Bureau throughout their careers.

The CES Discussion Paper series is a tangible measure of the output of CES and RDC research, and a key mechanism for disseminating that research. Contributing a Discussion Paper is also a requirement for all approved RDC research projects. The 33 Discussion Papers issued in 2006 mark an all-time high, following the previous high of 30 papers issued in 2005. These papers are listed in Appendix 3 and the complete list of papers is available at our Web site.

As usual, there are many contributors to this report. I want to thank B.K. Atrostic who coordinated the entire process and authored Chapter 4; Cheryl Grim, Rosemary Hyson, and Lynn Riggs for assistance in coordination and work on the appendixes, along with Brian Holly, Sang Nguyen, Ann Schatzer, Rebecca Turner, and Shigui Weng; and Randy Becker and Shawn Klimek for writing Chapters 2 and 3, respectively. In addition, I would like to thank our colleagues in the Publications Services Branch of the Census Bureau's Administrative and Customer Services Division who transformed CES's text into this well-designed and edited document. I would also like to thank our RDC partners and administrators for their efforts.

April 4, 2007

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## Chapter 1.

### INTRODUCTION

Research at the Center for Economic Studies (CES) and the Research Data Centers (RDCs) using internal U.S. Census Bureau data on businesses and households provides information that the Census Bureau needs to assure that those data meet the highest standards of quality and utility. A recent Census Bureau memorandum (U.S. Census Bureau 2007) explicitly notes the current and future importance of such research. Our report on research conducted at CES and the RDCs between 2000 and 2004 identified 20 major research themes, and our report for 2005 focused on just three, as does this report for 2006. Taken together, those summaries suggest the breadth of topics that can be addressed using such data. This year, our report emphasizes how the body of research fostered over the years by the Census Bureau and conducted by CES and RDC researchers yields intellectual capital that contributes to assessing and improving Census Bureau data in three areas—pollution, analysis of business data, and innovation.

Chapter 2 examines the Pollution Abatement Costs and Expenditures Survey, carried out by the Census Bureau for the U.S. Environmental Protection Agency. It discusses recent contributions to its redesign and announces a surprising discovery. Chapter 3 reports on the recent conference Comparative Analysis of Enterprise (Micro)

Data. We are pleased that CES and RDC research played such an important role in its success. Chapter 4 focuses on a “hot” intellectual topic—innovation. Besides our involvement in redesign of the Survey of Industrial Research and Development, CES and RDC research has illuminated our understanding of the research and development and innovation processes.

As noted in the message from the Chief Economist, staff of the Census Bureau and U.S. Bureau of Labor Statistics (BLS) have continued work on the comparison of the two business lists held by the agencies, BLS’s Business Establishment List (BEL) and the Census Bureau’s Business Register (BR). These business lists serve a number of functions including providing a frame from which surveys and samples are drawn and providing the data for published tabulations of business activity (the Census Bureau’s *County Business Patterns* and BLS’s *Employment and Wages Annual Averages*). The researchers on this project have jointly presented their results at the Joint Statistical Meetings in 2005 and 2006 and published these results in the conference proceedings (see Becker *et al.* 2005, and Elvery *et al.* 2006). Becker *et al.* (2005) show the results for the comparison of the data at the aggregate, published level for the reference year 2001. The key findings are

that while payroll figures from the two lists are close and track each other well over time, the two other measures differ substantially—employment is higher for the BR and the number of establishments is higher for the BEL, and these differences grow over time. Elvery *et al.* (2006) discuss preliminary results for the comparison of the microdata for the reference year 2001. The unit of observation for this microdata study is the Employer Identification Number (EIN) and they find that 93 percent of employment in either list is in an EIN that appears on both lists. The paper focuses on the EINs that can be matched across the two lists and that meet both agencies’ coverage rules. The key results for this group are that 77 percent of EINs have payroll that is closely matched, and 69 percent of EINs have employment that is closely matched (where closely matched is defined as two values that are within 2.5 percent of each other). Some insight has been gained from analysis of the 2001 data, but research is now focused on the comparison for 2003, since the 2003 BR reflects changes found by the 2002 Economic Census.

### RESEARCH DATA CENTERS

RDCs are secure Census Bureau facilities staffed by a Census Bureau employee. The Census Bureau operates the RDCs in partnership with prominent

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research universities and non-profit research organizations. The continuing support and active contributions of these institutional partners is essential to the successful functioning of the RDC system. The names of these partners are listed in Appendix 5. CES's proposal review process judges each research proposal against standards designed to assure that the project has the potential to provide benefits to the Census Bureau, has scientific merit, is feasible with the available data, is consistent with Census Bureau policies, and does not pose risk of disclosure of confidential information. The RDC system and the CES proposal process are described in detail on the CES Web site <[www.ces.census.gov/](http://www.ces.census.gov/)>.

Selected confidential data from the National Center for Health Statistics (NCHS) are now available to qualified researchers through the RDC system, under an agreement with NCHS. Proposals to use NCHS data at an RDC are submitted through the CES RDC proposal process, are not required to meet Census Bureau guidelines, but are required to meet NCHS guidelines. Further information about using NCHS data at the RDCs is available through the CES Web site, which also contains links to relevant NCHS Web sites.

## SUPPORTERS

The CES and RDC research programs rely on high-caliber professional support. The CES Data Staff regularly update the series in CES's holdings as new years of

data become available and add new data series. The list of data series added in 2006 is in Appendix 4. CES professional staff that manage the proposal and project processes are vital to the RDC research program. Because this report focuses on the products of research conducted at CES and in the RDCs, the work of these staff members is not described in detail. Nor does this report describe either the administrative support provided by our colleagues in the Governments Division, or the support to the CES and RDC computing infrastructures provided by our colleagues in several Census Bureau divisions. But the success of the CES and RDC research programs reflects their continuing contributions. The full CES staff and support roster is in Appendix 6 of this report.

The CES and RDC research programs also rely on the cooperation and support of the Census Bureau's business and household program areas. These groups provide the raw data from which researchers build databases to support their empirical work. Particularly for household data, the program areas review RDC research proposals, a vital step in assuring that approved RDC research projects hold the potential to benefit the Census Bureau, and serve as a technical resource for CES and RDC researchers. Their assistance allows CES to increase the number of data series available through the RDC system. The new data added in 2006 are listed in Appendix 4.

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## Chapter 2.

# NEW DEVELOPMENTS WITH THE POLLUTION ABATEMENT COSTS AND EXPENDITURES (PACE) SURVEY<sup>1</sup>

The Center for Economic Studies (CES) and Research Data Center (RDC) researchers contributed to two recent developments regarding the Pollution Abatement Costs and Expenditures (PACE) survey. First is the (unexpected) discovery of 5 years worth of historical microdata files. Second is the return of the PACE as a regular, annual survey, with the first new data expected later in 2007.

The PACE survey is the most comprehensive source of information on U.S. manufacturing's capital expenditures and operating costs associated with pollution abatement. Administered by the U.S. Census Bureau, the survey began in 1973. PACE data have been used extensively by government agencies, academic researchers, and industries to estimate the costs of environmental regulations and to analyze their effects. For some recent examples, see Becker (2005), Shadbegian and Gray (2005), U.S. Office of Management and Budget (2005), Becker (2004), Lee and Alm (2004), and Gray and Shadbegian (2003).

To date, studies using the establishment-level PACE data at CES and in the RDC system have faced two limitations. First, the microdata files were only available for 1979 forward. Microdata from the first six years of the

PACE (1973–1978) had been destroyed many years ago. Or so it was long believed! In the spring of 2006, CES staff members discovered data files on an old Census Bureau mainframe system, converted them into a more modern format, and eventually demonstrated that they were in fact the complete set of establishment-level records from the 1974–1978 PACE surveys.<sup>2</sup> This discovery is significant. These five years are as interesting as recent years—if not more so—since they generally capture the pre- and early-regulatory period. CES is now making these 5 additional years of data available to researchers who wish to analyze this heretofore unexplored period.<sup>3</sup>

The second limitation is that studies using *both* the published aggregate PACE statistics and the underlying establishment-level microdata have been limited by the lack of PACE data for recent years. The PACE survey was discontinued after 1994 for budgetary reasons. With guidance and financial support from the U.S. Environmental Protection Agency (EPA), a substantially new version of the PACE survey was administered for reference year 1999. However, for a number of reasons, the usefulness of the data

from this particular survey is limited (Becker and Shadbegian 2005). In response, in late 2003, the EPA began a significant initiative to redevelop the survey, guided by the advice of a multidisciplinary workgroup consisting of economists (including CES staff and RDC researchers), engineers, survey design experts, and experienced data users, and incorporating feedback from key manufacturing industries. After a pilot survey, administered to a limited number of establishments in mid-2005, a completely redesigned PACE survey covering reference year 2005 was fully launched in April 2006. Data from the 2005 PACE survey are expected later this year; PACE is intended to continue thereafter on an annual basis.

A summary of the 2-year effort to redesign and evaluate the PACE survey can be found in Becker and Shadbegian (2007). The redevelopment began with a historical review of the PACE and the literature that raised concerns about it. A series of preliminary interviews with establishments in key industries were conducted to obtain information on recordkeeping, whether businesses could report the data requested in PACE, and their views on previous survey instruments. These two steps, along with input from the multidisciplinary panel and a workgroup of representatives from EPA program offices, resulted in an early draft of a (new) PACE survey

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<sup>1</sup> This chapter was written by Randy Becker of the Center for Economic Studies (CES).

<sup>2</sup> Details are available in the CES memorandum "Notes on the 1974–1978 PACE Microdata" (Randy Becker, August 2006) and the associated programs and log files.

<sup>3</sup> Establishment-level data from 1973 and 1983 are still missing.

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instrument and instructions. The draft was followed by a number of additional interviews with establishments and industry trade associations. Feedback obtained from these visits was discussed and debated over a series of meetings with the expert panel. The end result of these efforts was a PACE survey instrument that would be the subject of a pretest and a pilot survey. Because of data users' need for longitudinal comparability, this new survey is closest in spirit to the 1994 PACE. The newly developed survey has some features of the 1999 survey but a different question structure than either the 1994 or 1999 survey. The new structure is one that interviews revealed is consistent with establishments' recordkeeping and their ability to respond.

To assess the performance of this revised survey instrument and instructions, and to gain approval from the Office of Management and Budget for the administration of a full survey for reference year 2005 and beyond, two distinct evaluation exercises were conducted. In one, 18 establishments were recruited to respond to a pretest survey and their responses were compared to estimates produced by engineers and economists during a visit to the establishment. Respondents were also asked to provide feedback on the survey instrument and to discuss the data sources and methodologies used to respond to the survey, including their ability to reliably identify and estimate environment-related costs apart from their total

costs. In another, responses to a much larger pilot survey of 2,051 businesses were compared to historical data, both at the industry level and at the establishment level. Conducted by CES staff, this analysis showed rather substantial (and perhaps unexpected) changes in certain classes of expenditures, which motivated a thorough review and comparison of the 2004 and 1994 surveys and led to recommendations for further substantial revisions and additions to the survey instrument and instructions that were subsequently incorporated in the 2005 PACE survey. The analyses also led certain provisional items to either be retained or removed from the survey. See Becker and Shadbegian (2007) for further details.

Becker and Shadbegian (2007) also discuss various "sample saving" measures that were taken with the 2005 PACE survey, as well as the method for industrial prioritization that was employed. And, in recognition of the fact that pollution abatement expenditures are typically unevenly distributed across industries and often across establishments within industries (e.g., relative to production), the 2005 PACE introduced corresponding innovations in sampling. Specifically, a challenge in drawing a sample for the PACE survey is that pollution abatement expenditures are not necessarily well correlated with total value of shipments—a measure of size (MOS) that is typically used in sampling and weighting in surveys such as this. In response, an *industry-*

*specific* MOS was sought, and an alternative MOS—such as cost of materials or cost of fuels—was employed in about 20 percent of industries. In industries for which no satisfactory MOS could be found, and/or with low expected incidence of PACE expenditures, a screener survey was sent to establishments in order to better target subsequent sampling.

It is worth noting the invaluable contributions of economists with extensive experience with historical PACE data throughout the redevelopment of the PACE survey—from the development and evaluation of the survey instrument to advice regarding sampling, the development of editing and imputation methodologies, the specification of tables to be published, and so forth. Not only do they have important knowledge of historical aspects of these data, but through their research, these economists also have a deep understanding of environmental regulation, who it affects, how it has been changing, and how it impacts (or should impact) those businesses' PACE-related costs.

In the expectation that such subject-matter knowledge and expertise would be needed and used, the Census Bureau deliberately fostered research over the years at CES and through its RDC program to use the historical PACE data. A primary purpose for the Census Bureau to encourage research using confidential, historical, longitudinally linked establishment-level microdata is to better understand the quality of its data through the intensive

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and extensive use of those data in investigating real world phenomena. What CES economists and RDC researchers discover in the course of their research with the establishment-level microdata may suggest better methodologies for producing the published aggregate estimates. Another product of this research is both in-house experts as well as a network of past and present research associates with rare and often extensive knowledge of Census Bureau survey microdata from their years of research experience. It is this expertise that has been tapped, by both the Census Bureau and EPA, throughout the PACE survey's redevelopment. This is an outstanding example of the use of the intellectual capital that the Census Bureau has purposefully cultivated over the years through CES and its RDC network.

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## Chapter 3.

### COMPARATIVE ANALYSIS OF ENTERPRISE (MICRO) DATA CONFERENCE<sup>1</sup>

The September 2006 Comparative Analysis of Enterprise (Micro) Data (CAED) conference, held in Chicago, Illinois, was the first CAED conference in the United States. The CAED brought together U.S. and international researchers from over 20 countries conducting similar research using enterprise microdata. The Center for Economic Studies (CES) co-sponsored the CAED; our partners were the Organization for Economic Cooperation and Development (OECD) and the Federal Reserve Bank of Chicago.

CES and Research Data Center (RDC) economists have participated in the CAED since its founding in 1996, but all previous conferences were held in Europe. Bringing the CAED to the United States provided opportunities for researchers at CES and the RDCs to present more research using U.S. Census Bureau microdata. A priority of the CAED is to encourage more research between microdata researchers in different countries, where researchers in each country use their own microdata to estimate a common model, similar to collaborative work being conducted at the OECD, Eurostat, and the World Bank. CES contributed to such a collaborative paper (Haskell, Jarmin, and Motohashi 2006), comparing retail market

structure and dynamics in the United Kingdom, the United States, and Japan.

Research from CES and the RDCs comprised more than one-quarter of the 2006 CAED program. These 24 papers span a range of topics, but the majority can be grouped roughly into three categories: productivity, labor, and services/retail. Productivity and labor have long been the focus of CES and RDC research, and these two groups together contributed nine papers to the conference. Although the services and retail sectors are relatively new topics for CES and RDC research, this group contributed six papers. The papers on productivity, labor, and services/retail are discussed in greater detail in the remainder of this chapter.<sup>2</sup>

CES continues to remain involved in planning and organizing future CAED conferences. The next CAED conference, to be held on May 22–24, 2008, at the Central European University in Budapest, Hungary, will again provide an opportunity for U.S. microdata researchers to interact with their international peers and a forum for presenting international collaborative research.

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<sup>2</sup> The CAED encourages the lively exchange of new research findings. Only abstracts are currently available for entries with an asterisk "\*" in the references, and these entries are not discussed in detail in the body of this chapter. Conference papers or abstracts can be found at the CAED Web site <[www.ces.census.gov/index.php/CAED/1.00/caedhome](http://www.ces.census.gov/index.php/CAED/1.00/caedhome)>.

### PRODUCTIVITY

The study of productivity is the most extensive line of research at CES and the RDCs, representing roughly one-third of all CES discussion papers. Most of this research uses only the Longitudinal Research Database (LRD) of manufacturing establishments. A contribution of 4 of the 5 CES/RDC CAED papers on this topic is combining the LRD with other Census Bureau or external data to extend the analysis of the behavior of firms, firm heterogeneity, and firm and aggregate productivity. The other Census Bureau data used in these papers include the Annual Survey of Manufactures (ASM), the Current Industrial Reports (CIR), Manufacturer's Orders, Shipments, and Inventories (M3), the Survey of Industrial Research and Development (SIRD), the Computer Network Use Supplement (CNUS), and the National Employer Survey (NES). External data sources include data from the U.S. Department of Energy, the Patent Database of the National Bureau of Economic Research (NBER), and a specialized survey instrument on the organization of the firm.

A dearth of data on output and input prices at the level of firms and establishments hampers attempts to interpret and analyze sources of productivity differences and differences in industry and exit behavior.

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<sup>1</sup> This chapter was written by Shawn Klimek of the Center for Economic Studies (CES).

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Davis et al. (2006) exploit a rich new database on Prices and Quantities of Electricity in Manufacturing (PQEM) to examine the relationship between physical efficiency in the use of electricity (output per kilowatt hour, or kWh) and price paid per kWh, or “price efficiency,” and to assess the impact of market structure on patterns of dispersion in the physical efficiency and prices of electricity. The PQEM data on prices and quantities show that there are large differences in the physical efficiency and prices of electricity within narrowly defined manufacturing industries. Again, within industries, there appears to be a positive tradeoff between the price and physical efficiency of electricity, with the tradeoff more pronounced in electricity-intensive industries. Although plants producing in narrowly defined industries are often thought to be competing in the same product market, Davis *et al.* (2006) suggest that they may not. They find evidence instead that an increase in local market density for locally traded goods yields a reduction in the dispersion of the productivity and physical efficiency of electricity.

A line of research suggesting that firms need to invest in assets such as organizational capital to realize the value of their investments in information technology is extended in Brynjolfsson *et al.* (2006). That research combines private survey data with the NES and the CNUS to construct new measures of organizational assets. Using these new measures, the

researchers find that, while the market values \$1 of installed property plant and equipment at very close to \$1, it consistently values computer assets more highly, exceeding \$10 per dollar of installed capital stock. This “excess valuation” of computers appears to be concentrated in firms that simultaneously make substantial investments in organizational capital (as the authors measure it) along with their computer investments. Prior research on organizational capital and information technology typically focused on manufacturing. The paper expands the scope of RDC research on these topics beyond the manufacturing sector.

Measuring the economic performance in an industry is not always straightforward. Multiple measures may be available from official and private sources, and may not always yield the same assessment of industry performance. Bayard *et al.* (2006) compare several microdata sources—the ASM, CIR, M3, and data from the private research firm, Gartner, Inc.—to help explain differences in aggregate outcomes for the computer industry.

U.S.-based establishments of multinational firms are sourcing a growing share of their research and development from foreign facilities. Kerr (2006) combines the LRD, the SIRD, and the NBER Patent Database to quantify the output and productivity implications of such foreign sourcing of research and development. The research also examines the interaction between local and foreign sourcing of research and

development for realizing operating gains.

The preceding papers combine microdata from the LRD with other datasets to extend the analysis of productivity. Another approach exploits the detailed information on productivity, industry, and geography. These data, combined with new techniques to estimate structural models, can be used to incorporate competitive effects into the analysis of productivity and simulate the effects of different policy instruments. Collard-Wexler (2006) uses Census of Manufactures data for the ready-mix concrete industry to analyze the dispersion of productivity and plant selection—the likelihood that the survival of plants is not random with respect to plant characteristics. The high transportation costs for concrete make it possible to identify the relevant set of local competitors for any specific concrete plant. Plants with high productivity are less likely to exit, plants are more likely to exit in markets with high productivity plants, and there is less entry in markets with higher productivity. Based on these findings, the paper extends the literature by developing a dynamic structural model of the effect of competition on the distribution of plant-level productivity.

## LABOR ECONOMICS

The four labor economics papers showcase how Census Bureau data can be used to analyze questions relevant for today’s economy. Few would argue that health insurance, outsourcing, and temporary workers are all

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important labor topics that need to be studied to understand their impact on the outcomes of both firms and workers. Three papers focus on these topics, while the other paper builds on the type of work done with the LRD on flows of workers and expands the results using the Longitudinal Business Database (LBD).

While many employers have cut back their health insurance benefits in response to rising costs, a sizable share of employers continued to pay 100 percent of premiums from 1997 to 2001. Zawacki and Taylor (2005) examine the characteristics of these employers and the choice of plans that they offer, using the Medical Expenditure Panel Survey–Insurance Component. Most of the establishments that paid 100 percent of premiums were young, small, single-unit establishments with a relatively high-paid workforce. In addition, fully paid plans generally required referrals to see specialists, did not cover preexisting conditions or outpatient prescriptions, and had no maximum limit set for annual out-of-pocket expenses. These plans were also more likely than plans not fully paid by employers to have had a fee-for-service or exclusive provider arrangement, had the highest premiums, and were less likely to be self-insured.

What are the determinants of a plant's decision to outsource its intermediate stages of production? How does a plant decide how much to outsource? Senses (2006) focuses primarily on the importance of high labor costs as a determinant of outsourcing and examines whether its

importance changes over time. The results show the responsiveness of the demand for contract work to changes in labor costs decreases over time, but labor costs continue to be an important determinant of the level of outsourcing. Also, larger plants and plants that are part of a multiunit firm are less likely to contract work out, although they contract out in higher levels if they decide to outsource.

Direct evidence of the relationship between temporary help services and labor market flexibility is examined in Ono and Sullivan (2006). This paper extends the literature on temporary workers by examining the relationship between the use of temporary workers (measured as the share of temporary workers using the Survey of Plant Capacity Utilization) and volatility at the establishment (measured using time series data on output from the ASM). The researchers find that their simple model does not provide any clear insights about the relationship between the proportion of temporary workers in a plant and the plant's size. However, they do find some evidence that a plant's size may influence its tendency to employ temporary workers.

The establishment and firm ownership data in the LBD are useful to study the demand-side view of the wage distribution. They can also be used to complement the extant literature on earnings inequality that typically uses data on individuals. Bryson *et al.* (2006) analyze the wage distribution of establishments over time and test for the presence of firm effects on levels and

changes in those distributions over time. They also explore how wage variations within (and across) establishments (and firms) contribute to the widening of the wage distribution.

## THE SERVICE AND RETAIL SECTORS

Perhaps the largest innovation in the research conducted at CES in the past decade is the use of data for sectors outside of manufacturing, demonstrated by the six CAED papers split evenly between retail and services. These papers generally focus on industrial organization topics—market structure, firm dynamics, and firm organization.

Hierarchies allow individuals to leverage their knowledge through others' time. This mechanism increases productivity and amplifies the impact of skill heterogeneity on earnings inequality. Garicano and Hubbard (2006) estimate an equilibrium model of knowledge hierarchies using data for law offices from the Census of Services. They find that the impact of hierarchy on productivity and earnings distributions is substantial but not dramatic, reflecting the fact that the problems lawyers face are diverse and that the solutions tend to be customized.

Production in restaurant chains provides an opportunity to examine the effects of residual claims on incentives—what is left after paying predictable expenses—because production is decentralized and fairly uniform across restaurants in the same chain. Using the Census of

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Retail Trade, LBD, and external data on restaurant chains, Yeap (2006) identifies company-owned and franchised establishments. She finds that more complex production activities are systematically correlated with company ownership. On-site food production raises the likelihood of company ownership by 28 percent relative to off-site food production. Table service raises the likelihood of company ownership by 26 percent relative to counter service.

Is there a relationship between information technology (IT) investments and the organizational structure of the firm? In the taxicab industry, cabs can be owned either by independent driver-owners or by taxicab firms. Rawley and Simcoe (2006) combine data from the Census of Transportation and Warehousing with external data on IT adoption to test the prediction that adopting mobile IT networks tends to extend the boundary of the firm towards firm ownership

of taxicabs. The results suggest that adopting mobile IT networks increases asset utilization by improving within-firm coordination, but that firms must simultaneously shift toward a more vertically integrated structure to fully capture the benefits of mobile IT networks.

What factors prompted the dominance of “mega” retail firms? Foster *et al.* (2006) look for patterns in the geographic expansion, size, and transition from privately held to publicly owned ownership for the firms that came to dominate the retail trade industry and ask how they differ from those that failed. Haskel *et al.* (2006) compare measures of retail sector structure and dynamics for the United States, the United Kingdom, and Japan, and also focus on the role that large chain stores play across the three countries. This internationally comparative project is one of the few at the CAED where individual researchers

with access to their country’s microdata each separately conduct parallel analyses. It is this type of work that CAED hopes to promote in CAED 2008 in Budapest, Hungary.

The relationship between the size of a market and its competitiveness has been a longstanding focus of economists. Dunne *et al.* (2006) use the Census of Services data to build a market-level dataset for a set of distinct geographic markets to estimate a structural model of the entry and exit of firms in two specific industries, chiropractor and dental offices. These market-level data allow the researchers to construct measures not available from Census of Service publications, such as the numbers of entering and exiting businesses and average profits in each market. Overall, the results provide evidence that lower entry costs lead to greater competition from potential entrants for chiropractor offices than for dental offices.

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## Chapter 4.

### MEASURING U.S. INNOVATIVE ACTIVITY<sup>1</sup>

Innovation is viewed as an important source of economic strength and vitality in the United States because it leads to new goods and services and increases in productivity that in turn lead to improved living standards. Research conducted over decades at the Center for Economic Studies (CES) and in the Research Data Center (RDC) system shows that innovative activity—activity including but not limited to innovation alone—affects productivity and other measures of economic performance. Better measures of innovative activity could improve what is known about the sources of productivity and economic growth. Consequently, measuring innovation, innovative activity, and other forms of intangible capital are intellectual topics attracting the attention of economists, policy makers, and statistical organizations.

Intellectual capital developed by CES and RDC researchers, fostered by the U.S. Census Bureau over many years, contributed to two recent federal initiatives that focus on improving the measurement of innovation. First, the National Science Foundation (NSF) held a June 2006 workshop, *Advancing Measures of Innovation: Knowledge Flows, Business Metrics, and Measurement Strategies*, to develop novel ways to use existing data, and to identify new data, to

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<sup>1</sup> This chapter was written by B.K. Atrostic, Center for Economic Studies (CES), and is based on Atrostic (2007).

improve measures of innovation (NSF 2006). A presentation by CES researcher B.K. Atrostic summarized relevant research conducted by CES and RDC researchers, drew out implications of that research for measuring innovative activity, and identified critical gaps in the data needed both to measure innovative activity and understand how that activity affects economic performance (Atrostic 2006).

Second, U.S. Commerce Secretary Carlos Gutierrez announced in August 2006 the creation of a new *Advisory Committee on Measuring Innovation in the 21st Century Economy* (U.S. Department of Commerce 2006). An expanded version of B.K. Atrostic's presentation at the NSF conference was provided to the Advisory Committee and is posted as a CES Discussion Paper (Atrostic 2007).

There have been calls for the United States to perform an innovation survey similar to those carried out in Canada and many European Union member countries. But neither a formal innovation survey nor more data on innovative activities would fill the critical and long-standing gaps in the core data needed to analyze economic performance—comprehensive coverage of non-manufacturing industries, including improved measures of output and sales and additional information on inputs such as capital, labor, and purchased materials at the micro (enterprise) level for

the same economic unit over time (so the effects can be measured). Without good longitudinal measures of these core data, it is hard to rule out the possibility that a measure of innovative activity merely proxies for something that is omitted from or measured poorly in the core data. Filling gaps would also provide more information about innovative activities and strengthen our ability to evaluate the performance of the entire economy.<sup>2</sup> This chapter presents highlights of CES and RDC research findings on selected aspects of innovative activity—use of advanced technologies and workplace practices, entrepreneurship, engaging in foreign trade, and worker and firm characteristics—and notes the key data gaps identified in current measures.

#### BACKGROUND

Innovation is one step in the dynamic process that starts with inputs to innovation (such as education and research and development—R&D) that yield the innovation itself, continues with the diffusion of the innovation to businesses or consumers, and leads finally to outcomes such as increased productivity, improved energy efficiency, or new consumer goods and services.

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<sup>2</sup> See also CES and RDC research on the assessments and tradeoffs required to develop new measures of the effects of investment in information technology on productivity (e.g., Atrostic, Gates, and Jarmin 2000; Mesenbourg 2001).

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The Census Bureau either currently collects, or has collected, data on some measures of innovative activity. The measures include the diffusion of innovations and technologies, human and organizational capital, entrepreneurship and other worker and firm characteristics, and the entry and exit of businesses.<sup>3</sup>

### ADVANCED TECHNOLOGIES AND WORKPLACE PRACTICES

Advanced technologies, as with other innovative activities, are not necessarily confined to the originating industry or area but can diffuse across industry and geography. A number of Census Bureau microdata sets can be used to examine characteristics of businesses that adopt new technologies and how that adoption affects the businesses' economic performance.

Industries differ in the advanced technologies they adopt (McGuckin *et al.* 1998). This research, using the Survey of Manufacturing Technology (SMT), also finds that plants may drop, as well as adopt, technologies over time.

Productivity is higher at plants using advanced technologies, even after controlling for multiple economic characteristics of

the plant. But the use of advanced technologies does not necessarily *cause* higher productivity. Instead, the analysis suggests that the positive relationship between productivity and the use of advanced technologies arises because operations that are performing well are more likely to use advanced technologies than poorly performing operations.

Newer plants are often thought to be more likely to adopt new technologies. However, Dunne (1994) finds only a weak relationship between the age of a plant and its use of advanced technologies. Plants might choose technologies that match the skills of their workers. Lewis (2005) combines SMT data on technology adoption with decennial census microdata about the skill level of workers living near plants. He finds that plants in areas with less-skilled workers may shift to less-advanced technologies that do not require as high a level of skill from their workers.

Strong empirical links have been found between productivity and the use of computer networks using data from the Computer Network Use Survey (CNUS) (Atrostic and Nguyen 2005). Computers and computer networks are distinct forms of capital that have separate links to productivity (Atrostic and Nguyen 2006a). However, only some of the ways that networks can be used are linked with productivity. Using networks to run sophisticated enterprise software is associated with higher productivity, as are using networks to control inventories and

logistics, but other uses, such as managing core production processes, are not (Atrostic and Nguyen 2006b). A study designed to be internationally comparable between the United States and Japan finds strong links between the use of computer networks and productivity in both countries. However, statistically significant links between productivity and specific ways of using networks, such as inventory control, are found only for the United States (Atrostic, Motohashi, and Nguyen 2005).

Spending on some forms of capital, such as computers, might indicate innovative activity. Recent data from the Annual Capital Expenditures (ACE) survey show that the typical firm concentrates spending on a few kinds of capital, with the specific kinds of capital varying substantially among firms. While previous research found that a firm's investment was typically lumpy over time, the newly available ACE data show that computer investment is less lumpy than other kinds of investment (Wilson 2004a). That investment in information and communication technology (ICT) is positively associated with productivity in both the manufacturing and nonmanufacturing sectors (Wilson 2004b). Prior research by CES and other Census Bureau staff (Atrostic, Gates, and Jarmin 2000) highlighted the importance of collecting data on all ICT spending, not just spending that qualifies as investment. New published data are now available on *all* ICT spending. The data show

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<sup>3</sup> While CES and RDC researchers have conducted a number of analyses of the R&D data, including many that link the R&D data with other microdata (see, for example, a number of papers by Adams on the CES Web site, <[www.ces.census.gov](http://www.ces.census.gov)>), those analyses largely took place in the early 1990s. Not only is there nearly a decade of new R&D data, but the Survey of Industrial Research and Development during this period also expanded beyond the manufacturing sector. This chapter focuses on research on kinds of innovative activity other than R&D.

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that the portion of spending that does not qualify as investment is an important share of all four major ICT groups, ranging from 28 percent of ICT equipment to 50 percent of computer software (U.S. Census Bureau 2006).

Businesses are thought to adopt new, “high-performance” workplace practices to improve business performance. Using data from the National Employer Survey (NES), Cappelli and Neumark (2001) find that “high-performance” workplace practices raise labor costs per employee and have a statistically weak link to improved plant-level productivity, raising output per dollar spent on labor. By contrast, Black and Lynch, in a series of articles (e.g., 2001, 2004, 2005) using the NES, find that workplace practices and the use of information technology are strongly related to multifactor productivity growth, as are investments in human capital and hiring better-educated workers.

## ENTREPRENEURSHIP

Summarizing the extensive research findings based on the Characteristics of Business Owners (CBO) survey is difficult. Researchers have examined topics ranging from the effects of franchising on business duration to whether intergenerational links in self-employment are due to family entrepreneurial preferences, rather than the inheritance of businesses. The research can be found under

*Discussion Papers* at Center for Economic Studies 2007.<sup>4</sup>

CES, in a major data development project, is creating an Integrated Longitudinal Business Database (ILBD) including businesses with and without employees that makes it possible to follow a business as it transitions from being a non-employer to an employer (Jarmin 2006). Initial research finds that young businesses are both very dynamic and volatile (Jarmin 2006).

## INTERNATIONAL TRADE

International trade (importing and exporting goods and services) is a rapidly growing economic activity. Engaging in it may be viewed as innovative activity because it requires innovative and flexible corporate management to deal with diverse cultures and far-flung production processes in an increasingly interconnected and complex world, and because it may facilitate innovative and flexible production. Until recently, however, traditional trade theory lacked both tools and data to analyze such behavior.

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<sup>4</sup> The 1987 and 1992 CBO survey contained detailed information about businesses and their owners. The CBO was replaced in 1997 by the Survey of Business Owners (SBO), which asks less financial information than did the CBO. However, while the 1992 CBO sampled 78,000 firms and 116,000 business owners, the 2002 SBO collected information on the characteristics of businesses, and business owners, for 2.4 million employer and nonemployer businesses. Most CES and RDC research on these topics has been based on the CBO, and most of it uses data from 1992 or earlier.

CES and RDC research findings on international trade were summarized in Krizan and Riggs (2006). Such firms have higher productivity, are larger, use more capital, and stay in business longer than firms that do not. Recent research finds that import and export flows at U.S. firms, and employment at U.S. firms that trade, are dominated by firms that both export to and import from related parties (Bernard, Jensen, and Schott 2005a). Corporate structure is important in trade, with multinational companies accounting for only 1 percent of U.S. manufacturing firms but about 20 percent of firms that trade (Bernard, Jensen, and Schott 2005a,b). Firms that outsource—produce parts of a product in several countries—have more workers, produce more output, and are more profitable (Kurz 2006). Another line of trade research examines the relationship between productivity and the domestic and international distances that plants ship their products (Holmes and Stevens 2006). The analysis uses information about the goods that manufacturing plants ship, based on the Commodity Flows Survey (CFS), and finds that large plants are more likely to be exporters and to ship longer distances domestically. One hypothesis is that productive plants undertake innovative activities, such as investing in the kinds of infrastructure needed to facilitate and monitor long-distance transactions.

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## WORKER AND FIRM CHARACTERISTICS

The Longitudinal Employer-Household Dynamics (LEHD) project at the Census Bureau uses modern statistical and computing techniques to combine federal and state administrative data on employers and employees with core Census Bureau censuses and surveys while protecting the confidentiality of people and firms that provide the data. Andersson *et al.* (2006) use LEHD data for the software industry to explore the link between the riskiness of the firm's product market—where risk derives from undertaking innovative activity—and the distribution of its workers' earnings. Software firms in markets whose returns have high variance pay more to attract and retain the star workers who produce the innovative new products that yield high returns to the firm.

## IDENTIFYING AND FILLING CRITICAL DATA GAPS

CES and RDC research has identified a number of critical gaps in core Census Bureau data about businesses. Coverage of services industries, which account for 55 percent of gross domestic product, is incomplete. Output data for services have been expanded in the last several years but still do not match the breadth of information available for manufacturing, nor are comprehensive data available annually for retail or wholesale trade. The input information that is needed to help explain economic change—

data on materials, energy, producer services, and other inputs—is much less complete for nonmanufacturing sectors of the economy. Data on technology diffusion, such as the use of advanced information and communication technologies, are rarely collected for the nonmanufacturing sector. Filling these core data gaps must be our highest statistical priority.

In services industries, however, data on inputs and outputs are collected in separate surveys that have different sampling frames and may be collected from different economic units, such as from a retail store and its corporate parent. While in principle the internal identification information exists to make appropriate linkages among service sector data, in practice it may be difficult. For example, Doms, Jarmin, and Klimek (2004) detail specific problems they encountered in trying to link data from the Censuses of Retail Trade and the Assets and Expenditures Survey (now the Business Expenditure Survey) over the 1992 to 1997 period. More generally, when such linkages are imprecise, it is difficult to assess the impact of any technology, process, or other innovative activity for the nonmanufacturing sectors and to compare such estimates with those based on manufacturing data.

Many important questions about technology and its diffusion in the U.S. economy are asked only infrequently. The absence of longitudinal information on these topics reduces our ability to understand the paths through which they can affect economic

outcomes such as productivity, long-term growth, or consumer well-being.

While large companies account for most of the economic activity in the United States, small businesses contribute to innovation and job growth. The Census Bureau must rely heavily on administrative data for information on small companies. Collecting more survey information on small businesses would improve our understanding of the dynamics of the U.S. economy, but increasing the respondent burden is unattractive. Research on how to leverage existing administrative data sources for small companies would be valuable.

The ability to link surveys and administrative data together and to link them over time is crucial. In order to be able to understand the process of innovation from its inputs, to its inception, through its diffusion to businesses or consumers, and finally to its outcome in terms of productivity or long-term growth or consumer well-being, it is necessary to link together the various data sources that measure the individual parts of the process. More reliable linkages can be made, and made more quickly, when potential linkages are considered in creating the survey design.

Collecting additional detailed data on inputs is also important. For example, the ACE survey collects data on information technology but lacks data on real (inflation-adjusted) capital stock, vintages of capital, or on service flows. These gaps limit

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the ability to understand all the sources of productivity growth, part of isolating the effect of innovation. There is a parallel need for detailed data on labor inputs.

Collecting new data, such as new surveys of innovation, technology use, or workplace practices, provides new information going forward. However, statistical agencies and respondents incur costs to provide that information. Leveraging existing data by linking records about the same business can fill some critical data gaps without expending the substantial resources required to collect new data. Most of the research papers cited in this review, for example, are based on linkages among different U.S. censuses and surveys.

In addition to more, and more thorough, analyses of existing data, a variety of new linkages would further leverage resources already expended on existing data collection and deepen and expand understanding of these topics. For example, the database on the merger and acquisitions structure of U.S. companies that CES researchers created in the 1990s (Nguyen 1998) has been extensively used to understand the effect of changes in corporate structure on economic performance and related outcomes. However, the database ends in 1992. Analyses have just begun using both survey and administrative data on international trade. The investment in the LEHD program has produced a growing number of linked microdata products that are just beginning to become available to CES and RDC researchers.

These new linkages of worker, employer, and administrative data hold the promise of filling critical data gaps, particularly gaps in what is known about the characteristics of workers and about the joint characteristics of workers and employers.

Finally, there are many sources of external data on businesses, such as investments in specific kinds of computer hardware or other technologies or financial characteristics (such as the foreign operations of firms operating in the United States, which are not collected by the Census Bureau), that could potentially be linked (in the secure RDC setting) with existing Census Bureau data. Analyses using such external data further leverage existing Census Bureau investments in data collection and linkages.

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## Appendix 1.

### CENTER FOR ECONOMIC STUDIES (CES) STAFF AND RESEARCH DATA CENTER (RDC) PUBLICATIONS, WORKING PAPERS, AND PRESENTATIONS

[Term inside brackets indicates work by CES staff or the main RDC involved]

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## Appendix 2.

### ABSTRACTS OF PROJECTS STARTED IN 2006

#### ESTIMATING THE IMPACT OF EDUCATION ON INEQUALITY AND ENHANCING THE COMPARABILITY OF SCHOOLING VARIABLES

*Josh Angrist—Massachusetts Institute of Technology*  
*Stacey H. Chen—State University of New York at Albany*  
*Justin McCrary—University of Michigan*  
*Heather N. Royer—University of Michigan*

We propose to use non-public-use data to construct instrumental variables estimates of the effects of education and veteran status on average earnings, wage inequality, and a number of noneconomic outcomes. The empirical strategy relies on instrumental variables

constructed from non-public-use data on date and place of birth, derived from the 1990 and 2000 census long forms, as well as college proximity and college costs, derived from the National Longitudinal Survey Original Cohort geocode. Our project benefits the U.S. Census Bureau

by using social security data to improve the imputation of a pre-1990 variable on highest grade completed from post-1990 categorical schooling variables and by establishing a procedure for matching the 1990 to 2000 censuses.

#### FROM THE BABY BOOM: THE CONTRACEPTIVE ORIGINS OF WOMEN'S CAREER MOBILITY

*Martha J. Bailey—University of Michigan*

Since the release of the first birth control pill in 1960, women's fertility and work decisions have undergone a dramatic transition. By the turn of the century, the high fertility rates and low participation of the Baby Boom had evolved into high employment and high childlessness. While recent work links oral contraception to changes in fertility and marital timing and changes in the labor-force participation rates of younger women, these studies do not explore the importance of oral contraception in reshaping the career and mobility decisions of young women. Moreover, research on the changing gender gap does not consider the significance of

greater fertility control on intermediate mobility decisions and, by extension, longer term wage and employment outcomes. The relationship of each of these outcomes with fertility control are interesting per se, but they may also provide insight as to how women were successful in "swimming upstream" in times of rising wage inequality and why changes in the gender gap appear to have stagnated since 1990. The proposed project will explore dimensions of career mobility that have been important to women's economic advancement since 1968—the importance of interstate mobility in determining educational, occupational, and employment paths and labor-force outcomes;

how the importance of mobility has changed over time; and how changes in women's career mobility might be related to oral contraception. The project uses the restricted access geographic identifiers both in the March Current Population Survey and the National Longitudinal Surveys of Young and Mature Women. These data facilitate both a comparative and descriptive analysis as well as an experimental evaluation of the origins and nature of the second demographic transition and the quality and shortcomings of the Current Population Survey in light of these population changes.

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## **AN EQUILIBRIUM MODEL OF AN URBAN HOUSING MARKET: IDENTIFICATION, SIMULATION AND HOUSING DYNAMICS.**

*Patrick Bayer—Duke University*

*Robert McMillan—University of Toronto*

This project has four related components. The first component continues research begun under our previous project at the Berkeley Research Data Center. At the heart of that project was the development of a general equilibrium model of an urban housing market, using an extensive dataset built around restricted-access decennial census data for 1990. In developing this framework further, we will focus on two areas—the identification of key parameters of the model using a boundary fixed

effects approach and carrying out informative counterfactual simulations using the equilibrium model in conjunction with our parameter estimates. The second component uses two waves of decennial census data, for 1990 and 2000, to study the effects of California's Class Size Reduction Act on local housing markets. Our goal is to measure the size of the induced effects of the reform on household sorting across schools and neighborhoods before estimating the effects of such changes

on school and student performance. The third component will make use of the rich cross-sectional data for 2000 to develop and estimate a matching model that describes how workers are matched to firms in equilibrium. And the fourth component will take advantage of the two waves of decennial census data for California (used in the second component of our proposed research) to estimate a dynamic housing market model.

## **LABOR MARKET RIGIDITIES AND THE EMPLOYMENT BEHAVIOR OF OLDER WORKERS**

*David Blau—University of North Carolina at Chapel Hill*

*Tetyana Shvydko—University of North Carolina at Chapel Hill*

This project will generate new information on rigidities in the labor market for older workers by using rich longitudinal survey data on individuals matched to employment data on the firms that employ them. The individual data are from the Survey of Program Participation and the employer data are from the Longitudinal Employer-Household Dynamics files. The aims of this project are to address the following issues: (1) What accounts for differences in the age structure of employment across firms? Why do some firms employ a larger proportion of older workers than others, and why do some firms hire a larger share of older workers than others? Do

differences in the age structure of employment across firms indicate the existence of labor market rigidities? (2) How does the age composition of employment and hiring in a firm affect hours worked and the rate of exit from the firm of older workers relative to younger workers, both to other firms and to nonemployment, controlling for the effects of worker characteristics? (3) What are the main factors responsible for rigidity in the labor market and its differential effects on older relative to younger workers? The main alternative explanations that can be analyzed with matched worker-firm data are technology-based—fixed costs of hiring, training,

and employment; team production considerations; costly monitoring of worker effort; and firm-specific human capital. These explanations can be studied with matched worker-firm data because technology is firm specific, even within industries. The project will address these questions by estimating regressions models explaining labor market transitions of workers as a function of the age distribution of employment in their firms, controlling for worker characteristics. The project will also estimate structural equilibrium models of the labor market intended to explain variation in the age structure of employment across firms.

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## THE EFFECTS OF TOP-CODING ON ESTIMATES OF UNITED STATES EARNINGS AND INCOME INEQUALITY

*Richard V. Burkhauser—Cornell University*

*Shuaizhang Feng—Cornell University*

In the United States, the Current Population Survey (CPS) Annual Social and Economic Supplement is the primary dataset used to measure these earnings inequality. However, over time U.S. Census Bureau survey and data storage decisions have changed the maximum value of income items reported from survey respondents. These limits were disproportionately restrictive in earlier years. Feng and Burkhauser (2005) argue that their loosening in later years is likely to have disproportionately impacted inequality levels and

trends over time. Despite these problems, we argue that even using only the public-use data, researchers can make sensible inferences with respect to levels and trends in inequality. This project will apply both the non-parametric and parametric approaches to the restricted-access CPS income data from 1975 to the present. By doing so, we will better measure the income and earnings distributions. In particular, we want to see how the upper portions of these distributions affect the levels and trends of inequality

measures such as the Gini coefficients. We will also evaluate the extent to which public-use data can be used to capture inequality levels and trends, using the approaches we proposed. Most importantly, the study will allow us to detect the differences in measuring inequality using the public-use data and restricted-access data. This will increase the value of public-use data to the research community, while still preserving the confidentiality of the restricted access data.

## RESEARCH ON ESTABLISHMENT MANAGEMENT PRACTICES USING THE NATIONAL EMPLOYER SURVEYS

*Peter Cappelli—The Wharton School, University of Pennsylvania*

*William Carter—The Wharton School, University of Pennsylvania*

This project will use the National Employer Survey (NES), and especially the NES 2000 survey, together with a number of other U.S. Census Bureau datasets, to examine the incidence of various innovative human resource practices (such as employee involvement plans, organizational learning practices, nonstandard employment

arrangements, and new personnel practices), the factors that determine their use, and the consequences of such use for organizational and individual outcomes (such as establishment performance, employee wages, and turnover). This project will provide a number of benefits to the Census Bureau's data programs, aside from the

estimates of characteristics of populations. Other benefits include assessing the NES's unique methodology for surveying employees and identifying emerging employment issues—such as the extent to which those working in establishments are not employees of the establishment—that can be used to guide future surveys.

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## EXPLORING TRANSITORY DIFFERENCES IN EDUCATIONAL LEVEL TO UNDERSTAND EDUCATION CHOICE AND TIEBOUT CHOICE

*David Card—University of California, Berkeley*

*Gregorio Caetano—University of California, Berkeley*

This project has two phases. Central to each component is an innovative framework that will enable us to use cross-sectional data to address certain dynamic questions regarding education. This framework leverages the discontinuity in the year of school entry created by the school entry rules in most states. The 2000 decennial census long form sample is crucial for the implementation of this framework. We will study some of the causal determinants and effects of schooling attainment, using the differences in schooling attainment as of a certain age that are created by the school entry laws. Our proposed

project will yield at least three benefits to the U.S. Census Bureau. We will develop a modified proxy of the variable “labor market experience”. We will develop a “modified potential experience” (MPE) variable that is a more accurate proxy for experience than the commonly used PE measure. As part of the first phase of our project we will use the MPE variable to provide new evidence on the value of additional labor market experience. We intend to estimate the fraction of recent movers who would have responded to the Current Population Survey WHYMOVE question that they moved for reasons of the education of the

children. The available responses to the WHYMOVE question exclude this possible answer, despite the fact that many families move to be closer to a desirable school. With the new imputed category, it will be possible to identify people who moved because of education for their children. As part of the second phase of the project we will use data from the census to summarize the characteristics of families who moved for education-related reasons (as opposed to other reasons) and develop reduced form and structural models of the process of residential mobility underlying Tiebout-style choice.

## THE IMPACT OF BANKING MARKET STRUCTURE ON THE LIFE-CYCLE DYNAMICS OF NON-FINANCIAL INDUSTRIES

*Nicola Cetorelli—Federal Reserve Bank of New York*

This project explores the effect of banking market structure on the market structure and growth of nonfinancial industries. It asks whether concentration in the banking market promotes the formation of industries constituted by a few, large firms, or, rather, whether it facilitates the continuous entry of new firms, thus maintaining unconcentrated market structures across industries. Theoretical argu-

ments could be made to support either hypothetical scenario. Further, it looks at the impact of banking market structure on employment growth, new firm entry, and establishment exit rates. Empirical evidence will be derived merging the panel information contained in the U.S. Census Bureau’s Longitudinal Business Database (LBD) with that on the banking industry contained in the publicly avail-

able Commercial Bank Report on Condition and Income of the Federal Reserve System. This project will evaluate the quality of the Finance, Insurance, and Real Estate census, and LBD data in two ways: 1) by assessing missing items, imputations, and inequalities; and 2) by comparing it to the Commercial Bank and Holding Company Database compiled by the Federal Reserve.

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## REGIONAL PURCHASE COEFFICIENTS AND U.S. INTERREGIONAL TRADE

*Richard Chard—U.S. Bureau of Economic Analysis (BEA)*

This project will develop an improved method for using U.S. Census Bureau data to measure the economic impacts of the interregional flow of goods and services and by providing to the Census Bureau advice that will improve the methodologies used to collect information on the interregional flow of goods and services. An additional purpose of this project is to analyze the shipment of manufactured goods among states and sub-state regions within the United States using Commodity Flows Survey (CFS) data. The analysis will model the patterns of trade

in manufactured goods among states and BEA economic areas using widely accepted regional location theory. Through this research, we plan to show how Census Bureau data could be better used to assess the economic impact of shocks by employing improved methods for using Census Bureau data and by suggesting changes to the collection methodologies used for the CFS. This will significantly benefit the Census Bureau through improved utility of its CFS. The improved method employed for measuring the impact of economic shocks

to localities relies on the estimation of regression-based Regional Purchase Coefficients (RPCs), based on Census Bureau microdata. We will calculate these RPCs using linked CFS, Annual Survey of Manufactures, and Census of Manufactures data. Ultimately, the RPCs will be used at BEA in two ways. First, an analysis of RPCs over time will shed light on how trade in intermediates has changed. Second, the RPCs will be used to estimate equations, which relate RPCs to characteristics of state economies.

## THE GOING PUBLIC DECISION AND THE PRODUCT MARKET

*Thomas Chemmanur—Boston College*

*Shan He—Boston College*

*Debarshi Nandy—York University*

While an initial public offering is probably the most heralded mechanism of going public, the most common and successful mechanism of going public is, however, through an acquisition of the private firm by an existing public company. Since going public allows the firm to access external financing through the equity market for the first time in its life, going public may have important implications for the firm's product market performance as well. In this research project, we will analyze

(for the first time in the literature) how the product market performance of a firm affects the timing of its going public decision. This analysis will inform the U.S. Census Bureau regarding the behavior of organizational change activity and its determinants, where the timing of changes in ownership informs business register processing activity. We also analyze the consequences of a firm going public on various aspects of its subsequent product market performance. We propose to

identify the sources of this poor performance by studying how a firm's productivity, sales, market share, labor costs and employment levels, material costs, rental and administrative expenses, and capital expenditures change subsequent to going public. This analysis will provide important information on the way in which firms report the value of these measures as collected by Census Bureau programs.

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## EVALUATING AND ENHANCING THE MEPS-IC AS A SOURCE OF EMPLOYMENT-RELATED INSURANCE ESTIMATES

*Philip F. Cooper—Agency for Healthcare Research and Quality*

*Kosali I. Simon—Cornell University*

*Jessica P. Vistnes—Agency for Healthcare Research and Quality*

In this project, we will use the Medical Expenditure Panel Survey Insurance Component (MEPS-IC) to produce estimates of the factors affecting employer-sponsored health insurance. We will investigate the quality of the MEPS-IC data, and we will enhance the usefulness of the MEPS-IC by matching

information from several other datasets to it. Estimates will be primarily derived from multivariate models and will focus on the following six broad areas: employers' decisions to offer insurance; employers' decisions on the types of plans to offer employees; employees' health insurance enrollment decisions;

employers' decisions on the structure of their contributions towards premiums; employers' labor market responses to employer-sponsored health insurance; employers' decisions with respect to health insurance eligibility rules.

## STARTING SCHOOL AT FOUR: THE EFFECTS OF UNIVERSAL PRE-KINDERGARTEN ON CHILDREN AND MOTHERS

*Maria D. Fitzpatrick—University of Virginia*

*Sarah E. Turner—University of Virginia*

Publicly subsidized universal prekindergarten (pre-K) programs have received considerable attention in recent years as an avenue for both promoting school readiness and providing child care. In this study we will estimate the effects of Pre-K programs on children's enrollment in preschool and on the labor supply (e.g., hours worked and wages) and welfare receipt of mothers. Each program has an age cutoff for enrollment. The methodology will employ

exogenous differences in eligibility across states and from these age restrictions to create 'treatment' and 'control' groups which will be used to determine program effects. The dataset used will be the 2000 confidential decennial long form sample. The proposed project will increase the utility to the U.S. Census Bureau of the data it collects by satisfying Criteria 9 and Criteria 11. The project will produce valuable estimates for use in an academic journal article.

Also, as was pointed out to us in discussions with Census Bureau officials in the Demographic Directorate program areas, the better understanding of family behavior regarding work and child care produced by this project will allow for insight that could change the way the Census Bureau asks its questions regarding early childhood education and care.

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## MINORITY SUBURBAN MIGRATION: A NEW ANALYTIC PARADIGM

*William Frey—University of Michigan*

*Kao-lee Liaw—McMaster University*

*Yu Xie—University of Michigan*

*Chang-cherng Sun—University of Michigan*

*Ge Lin—West Virginia University*

The proposed research introduces a new paradigm for the study of minority migration within metropolitan areas that goes beyond the “black-white, city-suburb” typology, which characterizes most of the detailed census migration analyses to date. This study takes cognizance of two developments. First, immigration and the recent foreign-born population have increased significantly over the past two decades, creating a broader mix of race and ethnic minorities. Their movement, both into and within the metropolitan area, requires a

new understanding of race-based migration dynamics of the central city and within the suburbs. This study develops such a paradigm, which explicitly recognizes new immigrant minorities and their migration components; as well as the heterogeneity of community types that have developed within the suburbs. Using a comparative metropolitan framework based on the 25 largest metropolitan areas, this research will show how race and ethnic immigrant/native migration processes vary across zones of suburban communities and

central cities and how they are shaped by these areas’ and their metropolitan areas’ sociodemographic and structural features. This study will develop a new multicategory typology and operationalize it within the 25 largest core based metropolitan statistical areas to be identified in 2003 by the Office of Management and Budget. It will also employ this typology in an analysis of intrametropolitan migration processes for these metropolitan areas, toward assessing the analytic utility of the typology.

## EMPLOYMENT AND TANF OUTCOMES FOR LOW-INCOME FAMILIES RECEIVING CHILD CARE SUBSIDIES IN ILLINOIS, MARYLAND, AND TEXAS

*Robert Goerge—Chapin Hall Center for Children, The University of Chicago*

*Mairead Reidy—Chapin Hall Center for Children, The University of Chicago*

*Allison Harris—Chapin Hall Center for Children, The University of Chicago*

*Bruce Meyer—University of Chicago*

*Jane Staveley—Jacob France Institute, University of Baltimore*

*J. Lee Kreader—National Center for Children in Poverty, Columbia University*

*Deanna T. Schexnayder—Ray Marshall Center, University of Texas*

*Daniel Schroeder—Ray Marshall Center, University of Texas*

The disparity between persons enrolled in U.S. federal poverty programs and persons who respond to U.S. Census Bureau surveys saying they are enrolled appears to be systemic across programs. This research will analyze the child care subsidy (CCS) take-up decision and a range of employment and welfare outcomes among all low-income families in Illinois,

Maryland, and Texas. This project will improve the Census Bureau’s understanding of who uses the child care subsidy and how the subsidy aids different groups of low-income families in their quest for economic independence. The groups we distinguish are those who are currently receiving cash assistance through the Temporary Assistance for Needy Families

(TANF) program, those who have recently left TANF, and those who have had no recent contact with the TANF program (frequently referred to as the working poor). This proposed research will further benefit the Census Bureau’s data programs by prototyping an eligibility microsimulation model for a specific federal poverty program (the Child Care and

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Development Fund in this case) that can be tailored for other programs. Since federal poverty programs are dependent on current surveys for program administration and program size estimates, the quality of the surveys is of great interest to the Census Bureau as well as to

federal poverty programs. The American Community Survey, while not providing significant detail on program utilization, has a large sample size, thus affording an opportunity to use it in concert with other smaller more detailed surveys, like the CPS and SIPP, to improve eligibil-

ity modeling. The primary dataset to be used for analysis, the Social Services Analysis File (SSAF), is an output of an internal Census Bureau project, PRED-607 TANF/Child Care Subsidy Research.

## WORKPLACE HAZARDS: DETERMINANTS AND ECONOMIC IMPACTS

*Wayne B. Gray—Clark University*

*John M. Mendeloff—University of Pittsburgh*

This project combines U.S. Census Bureau data with external information on workplace hazards to benchmark data consistency at the plant level, to model the determinants of those hazards, and to see how they affect economic performance at manufacturing plants. The relationship of hazards and plant data as reported will be investigated to learn if negative shocks to production resulting from accidents or catastrophes are accurately reflected in the data. We also examine the determinants of workplace hazards, based on a model of a profit-maximizing plant choosing an optimal level of hazard

abatement, given the pressures it faces. These pressures include the expected fine from being cited by an Occupational Safety and Health Administration inspector for the workplace hazard. Unionization of the plant is expected to provide an incentive for hazard reduction, both from increasing worker knowledge about workplace hazards and from providing a framework in which to negotiate compensating wage differentials. Our models of wages, employment, investment, and productivity will help identify situations in which we would expect a plant's economic variables to change dramatically (a new union

contract or a new government safety regulation requiring substantial new investments), which we will compare to the time-series variation in the Census Bureau data that these external pressures are expected to influence. A better understanding of external factors (e.g., unionization and workplace hazards) influencing economic outcomes such as productivity will also be valuable to Census Bureau analysts and researchers to evaluate circumstances when data and estimate adjustments may be warranted due to temporary disruptions in plant production.

## PLANT SIZE AND PLANT FUNCTION

*Thomas J. Holmes—University of Minnesota*

*John J. Stevens—Board of Governors of the Federal Reserve System*

This project expands the notion of within-industry heterogeneity in plant size beyond variation in productivity to include variation in function. The main idea is that small plants tend to do different things than large plants; in particular, they specialize in custom work or retail-like activity that is often efficiently

undertaken in small plants. This project studies the relationship between plant size and plant function by 1) constructing measures of dispersion across product lines within an industry across size classes; 2) looking for evidence that small plants engage in more custom and retail-like activity; 3) looking at

variation in market areas within narrowly defined industries; and 4) determining the extent to which changes in the distribution of manufacturing establishments at a location parallel changes in the retail sector.

The proposed project will benefit the U.S. Census Bureau

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through the tabulation of new statistics on the population of manufacturing establishments. These statistics will contribute to a better understanding of the limitations of the industrial classifications used by the Census Bureau. The proposed analysis of industry definitions is of particular interest at this time because of the major shift from the Standard Industrial Classification (SIC) system to the North American Industry

Classification System (NAICS) between the 1992 and 1997 Economic Censuses; this analysis will provide quantitative results on how the switch from SIC to NAICS affected the relationship between plant function and plant size within narrowly defined industries. In the longer run, the limitations of the industrial classification systems that we identify may aid in the design of future classification systems. The statistics tabulated

in this project will also improve our understanding of the quality of the export data collected in the Census of Manufactures and Commodity Flow Survey (CFS); in particular, we will use the information in the CFS data to learn whether the well-known understatement of exports in the Census of Manufactures reflects a failure to correctly report export status or a failure to correctly report the value of exports.

### **THE IMPACT OF DIFFERENCE IN ENUMERATION PROCEDURES AND CHANGES IN COMPLEX SURVEY QUESTIONS: CENSUS/ACS DISABILITY QUESTIONS**

*Andrew J. Houtenville—Cornell University*

*William Erickson—Cornell University*

*Robert Weathers—Cornell University*

We propose to analyze restricted data from the Census 2000 Long Form and the 2000–2003 American Community Survey (ACS) to further the understanding of respondent/enumerator error in responses to the “employment disability” question in these surveys. We propose to extend previous work to investigate the following questions: (1) What factors influence enumerator/respondent error in the employment disability question, and what groups are having difficulty with the employment disability question? (2) What is the impact of respon-

dent/enumerator error on the estimates of employment disability and overall disability; in other words, what would the Census 2000 statistics and 2000–2002 ACS statistics have looked like without respondent/enumerator error? Restricted data are needed because the Public Use Microdata Sample files do not contain enumerations information. The benefits to the U.S. Census Bureau are an increased understanding of (a) the benefits (in terms of the reduction of respondent/enumerator error) of using the more advanced ACS

enumeration process over the more costly Census 2000 enumeration process; (b) the types of individuals that had difficulty responding to the complex set of disability items; (c) the degree of respondent error that may still exist within the 2003 ACS; and (d) with this information, the ongoing process of developing and cognitively testing disability questions will be informed by helping refine the groups of individuals that should be targeted by cognitive testing. The ACS disability questions are in the process of being revised for the 2008 ACS.

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## PRODUCTIVITY DIFFERENCES ACROSS FIRMS AND COUNTRIES

*Chang-tai Hsieh—University of California, Berkeley*  
*Peter Klenow—Stanford University*

It is well established that there are large differences in productivity across firms, industries, and countries. Motivated by this fact, the purpose of this project is to use the Census of Manufactures (from 1963, 1967, 1972, 1977, 1982, 1987, 1992, 1997, and 2002) and the Annual Survey of Manufacturers (1973-2001) to develop a methodology for two new series for potential public release. These series help shed light on the underlying sources of productivity

differences. First, for 4-digit Standard Industrial Classification (SIC) and 5-digit North American Industry Classification System industries, and for state and metropolitan geographic areas, we will construct and document industry series on the quality of products made. This quality index will exploit the unit price data provided for many of the 7-digit SIC products in the Census of Manufactures to measure the extent to which differences in productivity across

establishments show up as differences in product quality. Our second contribution will be to provide new geographic area and industry series on the extent to which factor inputs are misallocated across plants in a geographic area or in a given industry. This “inefficiency” index will measure the potential gains in output if factor inputs were to be allocated efficiently across plants in the industry and area.

## ENDOGENOUS TECHNICAL CHANGE AND ENERGY PRICES

*Joshua Linn—University of Illinois at Chicago*

This project will use factor price and quantity data from the Longitudinal Research Database (LRD) and the Manufacturing Energy Consumption Survey (MECS) to perform a detailed analysis of energy data and plant productivity. The project will be beneficial to the U.S. Census Bureau in several ways. I will check data quality in these datasets by comparisons with publicly available data from the U.S. Department of Energy. I will investigate the extent to which greater detail in energy price aggregates and indices could be

published, both in terms of confidentiality risks and whether there is sufficient variation to make this valuable. I will also perform an investigation of data quality and the measurement of technological change to determine whether observed changes in energy efficiency are caused by a response to energy prices, as opposed to misreporting. This study will improve the Census Bureau’s knowledge base regarding manufacturers’ energy input values and the response of manufacturing production and technology to energy prices

and use. Estimates of cost functions for each industry will be used to calculate changes in energy productivity over time. This approach allows measurement of the effect of price-induced technical change on energy productivity by comparing the changes according to the industry’s initial energy intensity. The analysis will compare the energy efficiency of entering and existing plants, which will show how much technology adoption by existing plants reduces the total demand for energy.

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## AN EMPIRICAL ASSESSMENT OF THE VALUE OF ELECTRONIC INTEGRATION IN THE MANUFACTURING SECTOR

*Nigel P. Melville—University of Michigan*

Manufacturers are increasingly using the Internet to electronically integrate their business processes internally and across their network of trading partners. However, due to a lack of available data sources, information about the adoption and economic impact of Internet business practices is limited. The proposed study seeks to address this shortcoming by analyzing a dataset containing 39 measures of computer network use within U.S. manufacturing plants collected within the Computer Network Use

Supplement (CNUS) to the Annual Survey of Manufacturers (ASM). Additional datasets employed provide data on plant characteristics and efficiency for a period of multiple years prior

to and beyond the CNUS year (1999), including the Census of Manufactures and the Survey of Plant Capacity Utilization.

The sample of establishments responding to the CNUS accounts for roughly 50 percent of all manufacturing employment and salaries and 95 percent of online manufacturing cost of materials, with substantial variation in response rate by geography and plant size. Given that there may be systematic differences between respondents and nonrespondents, three approaches will be used to examine nonresponse bias. First, known differences in the samples (ASM characteristics such as value of shipments and employees) will be examined. For example, if CNUS respon-

dents tend to be from plants that are on average 10 percent larger, I can estimate the nonresponse bias by estimating the impact of a 10 percent change in plant size on CNUS variables. Second, I will compare measures from an independent survey with those of the CNUS survey. Third, I will compare the response rate to an ASM question on the value of e-shipments as a percentage of all shipments with measures collected within the CNUS, as well as the profile of responding plants to the ASM question versus the CNUS question. Regarding parameter estimates, innovation variables will be computed using the 39 dichotomous items available from the CNUS.

## OUTSOURCING BUSINESS SERVICES AND THE LOCATION OF MULTIESTABLISHMENT FIRMS

*Yukako Ono—Federal Reserve Bank of Chicago*

*Mohammad Arzaghi—American University*

*Richard Dye—Lake Forest University*

*Teresa Garcia-Mila—University Pompeu Fabra*

*J. Vernon Henderson—Brown University*

*Therese McGuire—Northwestern University*

The purpose of this proposal is to examine the quality of U.S. Census Bureau data on auxiliary offices and their firms and to perform an analysis of the firm determinants of nonresponse in Auxiliary Establishment (AE) datasets. We will investigate the determinants of a firm's decision to establish a separate headquarters facility, where to locate it,

and the determinants of outsourcing behavior by headquarters. We will use AE data, which provide information about the administrative establishments of firms. Since few researchers have used these data, assessing the quality of the data is an important part of the project. First, we will link the AE data to Compustat® and to the Business

Register in order to recover the main headquarters of the firm. Second, the characteristics of firms, as well as of local input service suppliers, will be constructed. Finally, the purchased service expenditures information in the AE and other datasets will be used to investigate outsourcing behavior. The project will benefit Census Bureau programs

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by exploring identification of the function performed by central administrative office (CAO) auxiliary establishments in the AE survey, both from the perspective of differentiating headquarters

offices from other administrative units, as well as through an exploration of nonresponse to the function related questions on the survey. The project will explain which firms tend to have

central administrative offices, where they locate them, and how their outsourcing behavior can be characterized.

## THE FINANCIAL ASSIMILATION OF IMMIGRANTS

*Anna Paulson—Federal Reserve Bank of Chicago*

*Una Okonkwo Osili—Indiana University-Purdue University Indianapolis*

While most discussions of immigrant assimilation focus on labor and housing markets, immigrant participation in financial markets is a critical and largely unstudied dimension of economic assimilation. The degree to which immigrants assimilate into the financial mainstream has profound implications for the U.S. economy. This project will provide new evidence on the extent of immigrant participation in financial markets and the key determinants of financial assimilation.

The aspects of financial assimilation that will be studied include use of checking and savings accounts, participation in the stock market, and investment in risky vs. “safe” assets. The analysis will be based on data from the Survey of Income Program and Participation (SIPP). These data will be supplemented with characteristics of the countries of origin and with data on the destination communities. The predominant purpose of this project is to benefit the U.S. Census Bureau’s program,

and it will do so in at least three ways. First, this study will compare SIPP data on immigrant year of arrival and country of origin to comparable data from the former Immigration and Naturalization Service. Second, this study will analyze the factors that account for the higher attrition rate of immigrants relative to the native born in the SIPP panel. Finally, the project will produce population estimates of the pace of immigrant financial assimilation.

## ETHNIC ENCLAVES AND LABOR MARKETS

*Roberto Pedace—University of Redlands*

*Mussaddeq Chowdhury—University of Redlands*

The goal of this research is to examine the relationship between Hispanic origin and race reporting and estimate how social networks associated with immigrant enclaves influence labor market outcomes. We will examine the effect of ethnic concentrations on both earnings and employment in several high-immigration states (California, Florida, Illinois, New Jersey, New York, and Texas) using the 1-in-6 sample of the 1990 and 2000 U.S. census. The large number of observations in these samples allows us to focus on broad ethnic categories (e.g., South

American and Mexican, East Asian and Pacific Islander, Southwest Asian and African, and European and Russian) as well as specific ethnicities (e.g., Mexican, Chinese, Indian, etc.) that cannot be analyzed with more readily available public-use data. In order to analyze the enclave effect, we will estimate a series of individual-level wage (and employment) equations that control for years since migration, cohort-specific effects, and other observable human capital and demographic characteristics. Wage and employment equations will be estimated for each ethnic

group and a measure that captures the proportion of the individual’s census tract that is populated by a particular ethnic group will be introduced into the model. The results of this study will provide an understanding of the relationship between race and ethnic information collected by the decennial census and will identify possible problems in current data collection strategies. In addition, the wage equations will provide valuable population parameter estimates of returns to observable human capital and social capital in immigrant communities.

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## **SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT: EVALUATION OF IMPUTATION METHODS**

*Adriana Pérez—The University of Texas at Houston Health Science Center*

The evaluation of the effect on estimates after imputation techniques have been applied and accounting for its uncertainty is an important enterprise in any survey. This research project seeks to carry out an in-depth evaluation of the effect of the current implemented imputation techniques in the annual Survey of Industrial Research and Development (SIRD). Since the early 1990s, there has not been a systematic evaluation of the current imputation procedures and their effects on survey estimates. The purpose of this project is to evaluate and recommend improvements to the

current imputation methods in the SIRD. Specifically, we will use the 1999-2003 SIRD datasets at the Center for Economic Studies to evaluate the effects of current imputation methods on survey estimates in the SIRD. This project has three aims: (1) to describe the current imputation methods currently used in the SIRD; (2) to evaluate the effectiveness of the current imputation methods through precision and accuracy measures; and (3) to compare current imputation methods with alternative imputation methods and formulate recommendations for improvement. The overall goal

is to assess the effect of the imputation techniques on the quality of this survey data, including variance estimates. Simulations will be carried out using standard precision and accuracy measures (bias, variance, and mean square error) for evaluating the current imputation methods. Multivariate distributional patterns of missingness will be described during implementation of simulations. Sensitivity analysis will be conducted to describe worst and best case scenarios on departures from current observed percentages of missingness.

## **ANALYSIS OF SMALL FIRMS SERVING A CLIENT BASE OF URBAN MINORITY HOUSEHOLDS**

*Alicia Robb—Foundation for Sustainable Development*

The purpose of this project is to evaluate survival patterns of firms in the 1992 Characteristics of Business Owners (CBO), particularly minority-owned firms in metropolitan areas. The project results will provide information that can be used to improve measurement of business survival in the new Survey of Business Owners and Self-Employed Persons (SBO). This project proposes to use the most current (1992) version of the CBO to revisit earlier findings regarding firm survival

patterns. It will investigate the robustness of the CBO database for portraying small-business survival patterns for employer businesses, using the Longitudinal Business Database (LBD) to track CBO firm survival patterns. This research also is relevant to the new SBO. Information from this will increase the U.S. Census Bureau's knowledge base regarding business survival dynamics. The SBO survey staff can use this knowledge to improve SBO response rates by tailoring their

sample designs to businesses based on their likelihood of still being in business. This could help reduce the number of out-of-scope cases that occur when a portion of the sample is selected from the previous year business register, but responses are only used when the business remains active for the next year. The results from this research can also assist the Census Bureau in the construction or improvement of the sampling frame for the SBO survey.

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## **RISING HEALTH CARE COSTS: EFFECTS ON LABOR DEMAND AND RETIREE HEALTH INSURANCE BENEFITS**

*Jennifer Schultz—University of Minnesota Duluth*

*David Doorn—University of Minnesota Duluth*

We propose to analyze the effects of health insurance benefit costs on employer demand for part-time employees, availability of retiree health insurance benefits, and the effects of unionization on health benefit offers and cost sharing arrangements by employers. To address these issues, we propose to use the Medical Expenditure Panel Survey-Insurance Component

(MEPS-IC) List Sample matched with the Longitudinal Business Database (LBD) and supplemental economic data from the U.S. Bureau of Labor Statistics (BLS) and the Area Resource File. This project will benefit the U.S. Census Bureau by contributing to the understanding of the quality of the data collected in the MEPS-IC by comparing variables reported by establishments and

firms in MEPS-IC and the LBD (e.g., tenure/age of firm). This project will also look for variability in reporting by establishments of the same firm and will derive methods to address inconsistencies. In addition, this project will benefit the Census Bureau by reporting estimates on the effects of rising health insurance on labor demand.

## **UNDERSTANDING MICRO-PRODUCTIVITY HETEROGENEITY**

*Jagadeesh Sivadasan—University of Michigan*

Making an initial public offering (IPO) of equity, otherwise known as “going public,” is an important event in the life of a firm. In this research project, we will analyze how the product market performance of a firm affects the timing of its going public decision. While the existing literature has documented that firms have poor operating performance (as measured by profits) in the years immediately after going public, the precise reason for this poor performance has not been previously addressed. We propose to identify the sources of this poor performance by studying how a firm’s productivity, sales, market

share, labor costs and employment levels, material costs, rental and administrative expenses, and capital expenditures change subsequent to going public. This analysis will provide important information on the way in which firms report the value of these measures as collected by U.S. Census Bureau programs. In addition, public firms in general are under more scrutiny and monitoring by regulatory agencies than private firms because once a firm becomes public, it has to file its relevant information on a regular basis to the securities exchange and other regulatory authorities, and answer to its

shareholders. Thus, the public financial disclosure requirement may strengthen the firm’s internal data collection and reporting, and this in turn may lead to a better response rate and better reporting quality to the surveys conducted by the Census Bureau. By identifying the public versus private status of establishments in the Census Bureau databases, we will also be able to analyze the data quality of these establishments prior to and after going public, and report if there are any changes in the quality of the data reported by various establishments after this change in public versus private status.

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## Appendix 3.

### CENTER FOR ECONOMIC STUDIES (CES) DISCUSSION PAPERS 2006

CES Discussion Papers are available at <[www.ces.census.gov](http://www.ces.census.gov)>.

- 06-33 “Access to Financial Capital Among U.S. Businesses: The Case of African-American Firms,” by Alicia M. Robb and Robert W. Fairlie, 12/06.
- 06-32 “Determinants of Business Success: An Examination of Asian-Owned Businesses in the United States,” by Alicia M. Robb and Robert W. Fairlie, 12/06.
- 06-31 “A General Inter-Industry Relatedness Index,” by David J. Bryce and Sidney G. Winter, 12/06.
- 06-30 “Gross Job Flows for the U.S. Manufacturing Sector: Measurement From the Longitudinal Research Database,” by Lucia Foster, John Haltiwanger, and Namsuk Kim, 12/06.
- 06-29 “Industry Learning Environments and the Heterogeneity of Firm Performance,” by Natarajan Balasubramanian and Marvin B. Lieberman, 12/06.
- 06-28 “The Industry R&D Survey: Patent Database Link Project,” by William R. Kerr and Shihe Fu, 11/06.
- 06-27 “Stability and Change in Individual Determinants of Migration: Evidence From 1985–1990 and 1995–2000,” by Charles M. Tolbert, Troy C. Blanchard, and Michael D. Irwin, 11/06.
- 06-26 “Efficiency Implications of Corporate Diversification: Evidence From Micro Data,” by Ekaterina E. Emm and Jayant R. Kale, 11/06.
- 06-25 “Explaining Cyclical Movements in Employment: Creative-Destruction or Changes in Utilization?,” by Andrew Figura, 11/06.
- 06-24 “Why Are Plant Deaths Countercyclical: Reallocation Timing or Fragility?,” by Andrew Figura, 11/06.
- 06-23 The Impact of Hurricanes Katrina, Rita, and Wilma on Business Establishments: A GIS Approach,” by Ron Jarmin and Javier Miranda, 8/06.
- 06-22 “Do Alternative Opportunities Matter? The Role of Female Labor Markets in the Decline of Teacher Quality,” by Marigee P. Bacolod, 7/06.
- 06-21 “Cementing Relationships: Vertical Integration, Foreclosure, Productivity, and Prices,” by Ali Hortaçsu and Chad Syverson, 7/06.
- 06-20 “The Dynamics of Plant-Level Productivity in U.S. Manufacturing,” by Árpád Ábrahám and Kirk White, 7/06.
- 06-19 “The Production Decisions of Large Competitors: Detecting Cost Advantages and Strategic Behavior in Restaurants,” by Clarissa A. Yeap, 7/06.
- 06-18 “Residual Claims and Incentives in Restaurant Chains,” by Clarissa A. Yeap, 7/06.
- 06-17 “Volatility and Dispersion in Business Growth Rates: Publicly Traded Versus Privately Held Firms,” by Steven J. Davis, John Haltiwanger, Ron Jarmin, and Javier Miranda, 7/06, *NBER Macro Annual 2006* (forthcoming).
- 06-16 “E-Tailing and its Prospects—Great Expectations Reconsidered,” by Jeffrey L. Mayer, 7/06.
- 06-15 “How Businesses Use Information Technology: Insights for Measuring Technology and Productivity,” by B.K. Atrostic and Sang Nguyen, 6/06, published under the title, “Information Technology and Business Process Impacts on U.S. Plant-Level Productivity,” *Price and Productivity Measurement* (forthcoming, 2007).

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- 06-14 "The Impact of Local Labor Market Conditions on the Demand for Education: Evidence From Indian Casinos," by William Evans and Wooyoung Kim, 6/06.
- 06-13 "Using the MEPS-IC to Study Retiree Health Insurance," by Alice Zawacki, 4/06.
- 06-12 "Impacts of Trade on Wage Inequality in Los Angeles: Analysis Using Matched Employer-Employee Data," by David L. Rigby and Sébastien Breau, 4/06.
- 06-11 "Measuring Poverty in the United States: History and Current Issues," by Daniel H. Weinberg, 4/06
- 06-10 "Downsizing, Layoffs, and Plant Closure: The Impacts of Import Price Pressure and Technological Growth on U.S. Textile Producers," by Patrick Conway, 4/06
- 06-09 "Import Price Pressure on Firm Productivity and Employment: The Case of U.S. Textiles," by Patrick Conway, 03/06.
- 06-08 "Plant Turnover and Demand Fluctuations in the Ready-Mix Concrete Industry," by Allan Collard-Wexler, 03/06.
- 06-07 "The Effects of Outsourcing on the Elasticity of Labor Demand," by Mine Zeynep Senses, 03/06.
- 06-06 "Is There Really an Export Wage Premium? A Case Study of Los Angeles Using Matched Employee-Employer Data," by Sébastien Breau and David L. Rigby, 2/06.
- 06-05 "The Work Disincentive Effects of the Disability Insurance Program in the 1990s," by Susan Chen and Wilbert van der Klaauw, 2/06, published under the title, "An Evaluation of the Impact of the Social Security Disability Insurance Program on Labor Force Participation During the 1990s," *Journal of Econometrics* forthcoming).
- 06-04 "Measuring the Dynamics of Young and Small Businesses: Integrating the Employer and Nonemployer Universes," by Steven J. Davis, John Haltiwanger, Ron S. Jarmin, C.J. Krizan, Javier Miranda, Alfred Nucci, and Kristin Sandusky, 2/06, *Producer Dynamics: New results from Micro Data*, (forthcoming).
- 06-03 "Reallocation and Productivity Dynamics in the Appalachian Region," by Lucia Foster, 1/06.
- 06-02 "Outstanding Outsourcers: A Firm- and Plant-Level Analysis of Production Sharing," by Christopher Johann Kurz, 1/06.
- 06-01 "Soft and Hard Within- and Between-Industry Changes of U.S. Skill Intensity: Shedding Light on Worker's Inequality," by T. Lynn Riggs and Grigoris Zarotiadis, 1/06.

## Appendix 4.

### NEW DATA AVAILABLE THROUGH RESEARCH DATA CENTERS (RDCs) IN 2006\*

<b>Data product</b>	<b>Description</b>	<b>New or updated years</b>
Annual Capital Expenditures survey and Information and Communication Technology survey	The Annual Capital Expenditures (ACE) survey is a firm-level survey designed to collect industry-level data on capital investment in new and used structures and equipment. The sample typically consists of large employers, small employers, and nonemployers. Additionally, expense data is available from the Information and Communication Technology (ICT) survey for 2003. ICT was a supplement to ACE. It collected technology investment figures falling below a company's capitalization threshold.	2003
American Community Survey**	The American Community Survey (ACS) is a nationwide survey designed to provide communities a constantly refreshed look at how they are changing. It will eliminate the need for the long form in the 2010 Census. The ACS collects information from U.S. households similar to what was collected on the Census 2000 long form, such as income, commute time to work, home value, veteran status, and other important data.	2004
American Housing Survey**-Metro B Data	<p>The American Housing Survey collects data on the nation's housing, including apartments, single-family homes, mobile homes, vacant housing units, household characteristics, income, housing and neighborhood quality, housing costs, equipment and fuels, size of housing unit, and recent movers. National data are collected in odd-numbered years, and data for each of 47 selected metropolitan areas are collected about every 4 years, with an average of 12 metropolitan areas included each year.</p> <p>The corrupted datasets of the neighborhood quality supplement (B type) for 1987 metropolitan areas were replaced.</p>	1987
Annual Survey of Manufactures	The Annual Survey of Manufactures provides statistics on employment, payroll, worker hours, payroll supplements, cost of materials, value added by manufacturing, capital expenditures, inventories, and energy consumption. It also provides estimates of value of shipments for over 1,800 classes of manufactured products.	2003–2005
Census of Finance, Insurance, and Real Estate	The Finance, Insurance, and Real Estate sector comprises establishments primarily engaged in financial transactions (transactions involving the creation, liquidation, or change in ownership of financial assets); facilitating financial transactions; managing real estate for others; selling, renting and/or buying real estate for others; and appraising real estate.	2002

<b>Data product</b>	<b>Description</b>	<b>New or updated years</b>
Census of Manufactures	The manufacturing economic census is the major source of information about the structure and functioning of the manufacturing sector. It provides essential information for government, business, industry, and the general public.	2002
Census of Retail Trade	The Census of Retail Trade covers domestic establishments with payroll that retail merchandise, generally without transformation, and related services.	2002
Census of Services	<p>The Census of Services covers hotels, motels, and other lodging places; personal and business services; automotive repair, services, and parking; miscellaneous repair services; and amusement and recreation services, including motion pictures. The Census of Services also includes health services; legal services; educational services, except elementary and secondary schools, colleges and universities, professional schools, and junior colleges; social services; museums, art galleries, botanical gardens, and zoos; membership organizations, except labor unions and political and religious organizations; engineering, accounting, research, management, and related services; and services not elsewhere classified.</p> <p>The 2002 Census of Services data at the Center for Economic Studies (CES) also covers Management of Companies and Enterprises (NAICS code 55), which was covered in the 1997 Census of Finance, Insurance, and Real Estate.</p>	2002
Census of Transportation, Communications, and Utilities	The Census of Transportation, Communications, and Utilities includes industries providing transportation of passengers and cargo, warehousing and storage for goods, scenic and sight-seeing transportation, and support activities related to modes of transportation.	2002
Census of Wholesale Trade	The Wholesale trade sector comprises establishments engaged in wholesaling merchandise, generally without transformation, and rendering services incidental to the sale of merchandise.	2002
Manufacturing Energy Consumption Survey	The Manufacturing Energy Consumption Survey is the Energy Information Administration's survey of energy consumption and usage patterns, and measures the short-term capability to substitute fuels in place of those usually consumed.	2002
Medical Expenditure Panel Survey-Insurance Component	The Medical Expenditure Panel Survey-Insurance Component collects data on health insurance plans obtained through employers. Data collected include the number and type of insurance plans offered, benefits associated with these plans, premiums, contributions by employers and employees, eligibility requirements, and employer characteristics.	2003, 2004

<b>Data product</b>	<b>Description</b>	<b>New or updated years</b>
Pollution Abatement Costs and Expenditures Survey	Data collected include capital expenditures and operating costs by type of media and the percent that is attributed to hazardous materials. Types of pollutants include air, water, and solid waste. The survey also collects data on disposal and recycling expenditures and costs, pollution prevention, site cleanup, habitat protection, environmental monitoring and testing, administrative environmental programs, permits, fees, penalties, and fines.	1974–1977
Survey of Income and Program Participation Panels**	The Survey of Income and Program Participation collects information on source and amount of income, labor force information, program participation and eligibility data, and general demographic characteristics to measure the effectiveness of existing federal, state, and local programs; to estimate future costs and coverage for government programs, such as food stamps; and to provide improved statistics on the distribution of income in the country.	2001
Survey of Industrial Research and Development	The Survey of Industrial Research and Development is the primary source of information on research and development performed by industry within the United States. The results of the survey are used to assess trends in research and development expenditures. Government agencies, corporations, and research organizations use the data to investigate productivity determinants, formulate tax policy, and compare individual company performance with industry averages.	2001–2003
Standard Statistical Establishment Listing	Standard Statistical Establishment Listing files maintained at CES are created from the old Standard Statistical Establishment List (prior to 2002) and the new Business Register (2002 and forward).	2002–2004
Total Factor Productivity files	Total Factor Productivity files contain information for computing total factor productivity for firms in the Annual Survey of Manufactures and Census of Manufactures.	1972–2000

\*This table does not include custom extract data made available to approved projects from the Longitudinal Employer-Household Dynamics program in 2006.

\*\*These demographic or decennial files maintained at CES and for the RDCs are internal versions, and they provide researchers with variables and detailed information that are not available in the corresponding public-use files.



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## Appendix 5.

### RESEARCH DATA CENTER (RDC) PARTNER INSTITUTIONS

#### Berkeley RDC

University of California, Berkeley

#### Boston RDC

National Bureau of Economic Research

#### CES RDC

Administration for Healthcare Research and Quality  
Bureau of Economic Analysis  
Federal Reserve Board of Governors  
National Center for Health Statistics

#### Chicago RDC

Argonne National Laboratory  
Federal Reserve Bank of Chicago  
Northwestern University  
University of Chicago  
University of Illinois

#### Michigan RDC

University of Michigan

#### New York RDC (Baruch and Cornell)

Baruch College, City University of New York  
City University of New York  
Columbia University  
Cornell University  
Federal Reserve Bank of New York  
Fordham University  
National Bureau of Economic Research  
New York University  
Pace University  
Princeton University  
Russell Sage Foundation  
Rutgers University  
Stony Brook University, State University of New York  
University at Albany, State University of New York  
Yale University

#### Triangle RDC

Duke University  
North Carolina State University  
The University of North Carolina at Chapel Hill

#### UCLA RDC

University of California, Los Angeles



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## Appendix 6.

### Center for Economic Studies (CES) STAFF LISTING 2006

April 2007 CES Staff in **bold**.

<b>Name</b>	<b>Position</b>
<i>CES Senior Staff</i>	
<b>Atrostatic, B.K.</b>	Senior Economist
<b>Holly, Brian</b>	Project Review Coordinator
<b>Jarmin, Ron</b>	Assistant Division Chief for Research
<b>Mildorf, Mark</b>	Assistant Division Chief for Research Support
<b>Weinberg, Daniel</b>	Chief Economist and Chief, Center for Economic Studies
<b>Weng, Shigui</b>	Chief, Data Staff

#### *CES Staff Researchers*

<b>Becker, Randy</b>	Senior Economist
<b>Foster, Lucia</b>	Senior Economist
<b>Grim, Cheryl</b>	Economist
<b>Haltiwanger, John</b>	Senior Economist
<b>Klimek, Shawn</b>	Senior Economist
<b>Krizan, C.J.</b>	Economist
Luque, Adela	Economist
<b>McCue, Kristin</b>	Economist
<b>McInerney, Melissa</b>	Statistician
<b>Michaelides, Marios</b>	Economist
<b>Miranda, Javier</b>	Economist
<b>Nguyen, Sang</b>	Senior Economist
Nucci, Alfred	Statistician
<b>Zawacki, Alice</b>	Economist

#### *CES Data Staff*

<b>Goodloe, Mike</b>	Information Technology Specialist
<b>Iceland, John</b>	Sociologist
<b>Ryan, David</b>	Information Technology Specialist (Microcomputer Systems)
<b>Singal, Anurag</b>	Information Technology Specialist (Data Base Systems)
<b>Wu, Xiaoyu</b>	Sociologist
<b>Yates, Michele</b>	Survey Statistician

#### *CES Computer Staff*

Lessard, James	Information Technology Specialist (Data Base Systems)
Linonis, Cyr	Information Technology Specialist (Systems Analyst)
<b>Yates, William</b>	Information Technology Specialist (Programming & Analysis)

#### *RDC Administrators*

Acosta, Rebecca	Los Angeles (UCLA)
Chandra, Pinky	New York (Ithaca)
<b>Davis, James</b>	Boston
<b>Dragoset, Lisa</b>	New York (Ithaca)
<b>Hyson, Rosemary</b>	New York (Baruch)

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<b>McKinney, Kevin</b>	Los Angeles (UCLA)
Milby, Ritchie	Berkeley
<b>Reznek, Arnold</b>	Washington, DC (CES Headquarters)
<b>Riggs, T. Lynn</b>	Chicago
<b>Sedo, Stanley</b>	Ann Arbor (Michigan)
<b>White, T. Kirk</b>	Research Triangle (North Carolina)

### *Administrative Staff*

<b>Anderson, Dawn</b>	Division Chief Secretary
<b>Cross, Henry</b>	Student Intern
Foster, Tenille	Secretary
Hood, Michelle	Division Chief Secretary
<b>Schatzer, Ann</b>	Secretary to the Project Review Coordinator
Solier, James	Student Intern
<b>Turner, Rebecca</b>	Secretary to the ADC for Research
<b>Wright, Deborah</b>	Secretary to the ADC for Research Support

### *Administrative Staff—Governments Division/CES Administrative Office*

Conley, Anita	Administrative Assistant
Dennison, Marilyn	Lead Financial Assistant
Hood, Michelle	Administrative Assistant
Kiatta, Cheryl	Administrative Officer
Magee, Staci	Administrative Assistant
Schafer, Jackie	Administrative Assistant

### *Computer Services Division*

Caputo, Dean	Information Technology Specialist (Systems Analyst)
Pleiman, Leo	Information Technology Specialist (Systems Analyst)
Stolba, Darrin	Information Technology Specialist (Systems Analyst)

### *Economic Directorate Computer Staff*

Monahan, James	Senior Information Technology Specialist
Murray, Michael	Information Technology Specialist (Systems Analyst)

### *LAN Technology Support Office*

Lawrence, Debbie	Information Technology Specialist
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