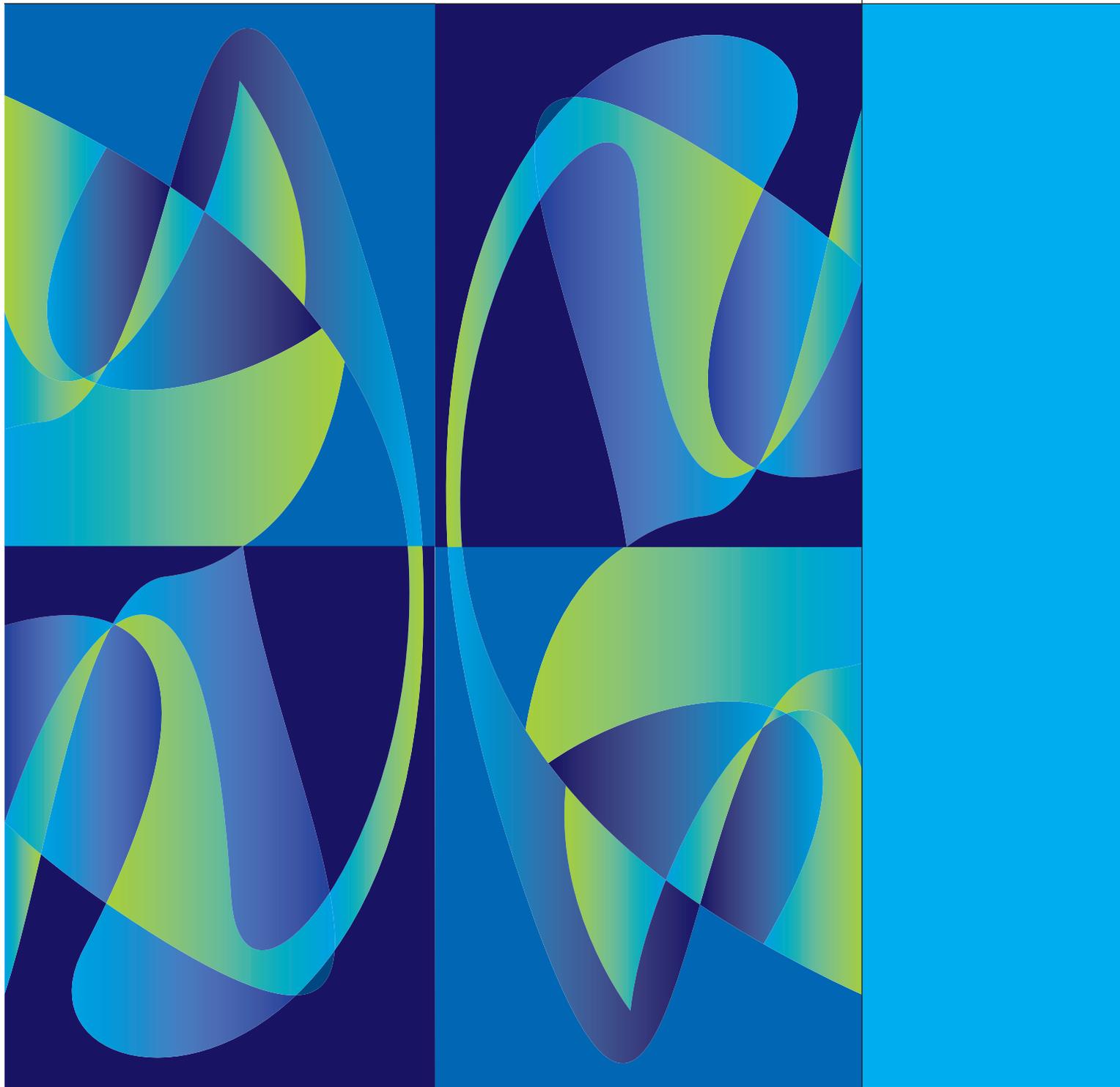


Research at the Center for Economic Studies and the Research Data Centers: 2000 – 2004

April 2005



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RESEARCH AT THE CENTER FOR ECONOMIC STUDIES AND THE RESEARCH DATA CENTERS: 2000 - 2004

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A Message from Daniel Weinberg, Ph.D., Chief of the Center for Economic Studies

It was with great pleasure I accepted an offer to become Chief Economist of the Census Bureau and Chief of the Center for Economic Studies (CES) in December 2004. CES has had a long and productive role in illuminating the value of microeconomic analysis of business behavior, inaugurating an ever-widening stream of research that uses the decades of data on individual businesses collected by the Census Bureau. This stream of research continues at the Center, with new directions being spawned by the Longitudinal Business Database (LBD), which includes data on non-manufacturing enterprises and nonemployers, supplementing the now-venerable manufacturing-oriented Longitudinal Research Database (LRD). Of note is the April 2005 Conference on Research on Income and Wealth meeting that focuses on research findings using data from the LRD and the LBD.

This admirable Census Bureau-initiated research program is supplemented by extensive research using both business and household microdata carried out at the Census Bureau's network of Research Data Centers (RDCs). RDCs are established through partnership with academic and non-profit institutions to encourage additional research with confidential Census Bureau data that will both provide benefits to the Census Bureau from such research and contribute to the public's understanding of business and individual behavior. In the past year, the RDC at Carnegie-Mellon University has closed, but a new RDC has opened at Cornell University in Ithaca, NY and a second NY RDC is planned, at Baruch College in New York City, to open in June 2005. This will bring the total number of RDCs to nine: in Ann Arbor, Berkeley, Boston, Chicago, Ithaca, Los Angeles, New York City, Research Triangle, and Washington DC (at CES headquarters).

Given my own background in microeconomic analysis of households, families, and individuals, one of my goals is to expand the use of "demographic" household survey data at the RDCs. We anticipate an ever-growing use of Census Bureau household microdata such as the American Community Survey. The files that can be made available in the RDCs to authorized projects have some but not all of the information that is suppressed or omitted in public-use files to protect respondent confidentiality (e.g., detailed geography and occupation, income that is not topcoded).

One interesting set of data just coming on-line in the RDC environment is data from the Longitudinal Employer-Household Dynamics (LEHD) program. LEHD data combine information from household surveys with business data from various administrative and survey sources; we expect researchers to begin using these data shortly.

A new and exciting project just over the horizon is the RDC partners' future collaboration on developing "synthetic" microdata. If this research is successful, synthetic data thereby created can mirror all the correlations and multivariate relationships inherent in the confidential data but would contain nothing that cannot be placed in the public domain. The first datasets to be investigated are the LBD and the LEHD datasets. The National Science Foundation has agreed to provide the funds to carry out this research and will be funding the acquisition of a "supercluster" computing environment to be accessed through the RDC network to facilitate this research by a nationwide network of collaborators. We view this research as yet another way to enhance the value of Census Bureau data for our data users.

This report on CES and the RDC research programs would not be complete without acknowledging the strong and sustained leadership of Frederick T. Knickerbocker, Ph.D., Associate Director for Economic Programs at the Census Bureau from March 1995 through March 2005. Knick's vision, advocacy, and insights – always delivered with wit and style – supported CES and the RDC program during a period of growth and change. This organization would probably not exist today were it not for his dedication and support.

I would like to thank all who contributed to this report, particularly B.K. Atrostic, who led the effort and wrote or edited much of it, and Randy Becker, Cheryl Grim, Mary Ellen Hajmosi, Melissa McInerney, and Ann Schatzer.

I look forward to being associated with this organization, its talented staff, and the Research Data Center partner organizations for many productive years.

April 2005

Understanding the U.S. economy and the behavior of its businesses and individuals requires good empirical research. Good empirical research, in turn, requires good data. Using the microdata that the Census Bureau collects – data that underlie many major economic statistics, measures of economic activity, and our understanding of individual behavior – in rigorous empirical analysis is the best way for the Census Bureau to assess the quality of those data. Each microdata record results from dozens of decisions about definitions, classifications, coding procedures, processing rules, editing rules, disclosure rules, and so on. Analyses test the validity of all these decisions and uncover the data's strengths and weaknesses.

The Center for Economic Studies (CES) is the heart of a nationwide network of economists and other social scientists using these microdata to study the issues of the day and to illuminate a changing and dynamic society and economy. These studies yield new information, sometimes paradigm-shifting, for decision makers in the public and private sectors. The research also informs the U.S. and international statistical systems, altering the focus of data collections.

For over 20 years, CES research has contributed to a widely recognized body of empirical studies in the economics and dynamics of businesses. Economist Ronald Coase's 1991 Nobel Prize lecture recognized the potential contribution of the data then just becoming available through the Research Data Center (RDC) system to further our understanding of how the real economy works.¹ In a 1997 study, CES research ranked in the top 100 among 1000 public, academic, and private research institutions world-wide on an *American Economic Review* quality-adjusted standard.² The CES research described in this report continues that legacy. CES research influences the direction of empirical research and the development of theory in a growing number of topics. Research by CES staff, and research by external researchers in the Census Bureau's RDC system that CES administers, is published in major journals in economics and related social sciences. CES Working Papers are offered by major on-line services such as Research Papers in Economics, where they are frequently viewed and downloaded.

CES staff research covers a broad and diverse set of topics ranging from the demography and dynamics of businesses, through micro foundations of macro statistics, to worker-employer relationships. Research in the RDC system includes all the topics in CES staff research, and adds additional topics ranging from corporate finance, through income and poverty measurement and dynamics, and migration, through neighborhood characteristics. The topics reflect the breadth and diversity of the topics reflects the breadth and diversity of the U.S. population and economy.

Census Bureau data are major federal statistical series in their own right as well as being inputs to statistics produced by other organizations. The dynamic U.S. economy and society mean that the Census Bureau must constantly assess the fit between the information it collects and evolving needs for data. Research conducted by CES staff, and by researchers in the Census Bureau's RDC system, contributes to that on-going assessment. CES researchers and approved external researchers may also work directly with Census Bureau program areas in all phases of data development, collection, processing, and analysis of important statistical series.

CES research is the fruit of databases developed at CES. CES staff and RDC researchers both create those databases. Turning the raw microdata files used to develop Census Bureau statistical products into databases that can be used to support economic

analyses is hard work because business-oriented economic data are not designed, collected, and processed with such micro-analytical uses in mind. The number of surveys and censuses outstrips the capacity of CES and RDC researchers to turn all of them into user-friendly, well-documented databases. Some CES databases require significantly more economic analysis and work to create. In many cases, analytical variables must be created from combinations of basic variables, in ways that carefully apply economic and statistical theory. For example, longitudinal databases are critical to CES's ability to highlight the economic dynamics of business units, countering the convenient myth of the "typical" or "representative" plant or firm. Creating longitudinal databases requires linking information over time about the same economic unit, a challenging task because business units begin and cease economic activity, and change the economic activity they conduct while active.

CES and RDC researchers have created several research databases based on combinations of survey, census, and administrative information. The Decennial Employer-Employee Database (DEED) project brings together detailed information about businesses and their workers. The 1990 DEED has been created and construction of the 2000 DEED is underway. An energy database was created from annual, plant-level electricity prices from the Annual Survey of Manufactures (ASM) plants for the years 1963, 1967, and 1972-2000. A public-use version of gross employment flows data covering the manufacturing sector currently exists for 1972 -1993 and is being updated by CES and RDC researchers.

Much CES research long relied on the first longitudinal dataset created at CES, the Longitudinal Research Database (LRD). The LRD links plant level data from the Censuses and Annual Surveys of Manufactures. The Longitudinal Business Database (LBD) is the most recent effort at CES to create a longitudinal research micro dataset; it encompasses nearly all the non-farm private economy as well as some public sector activities. It contains data from 1975 to 2001, offering a long continuous time series through 2001. Although the LBD contains only basic information about business establishments, it can easily be linked to richer information contained in over 250 Economic Censuses and surveys.

CES's contributions to improving information increasingly come through its role administering the Census Bureau's RDC program. The RDC program began at CES headquarters in the suburbs of Washington D.C. It expanded in the 1990s, and as of June 2005 will include eight additional RDCs across the United States that were created in partnership with universities and other research institutions. This program provides new groups of qualified researchers around the country with restricted access to selected Census Bureau microdata. These researchers' contributions would otherwise likely have been foregone because of the substantial time and financial investments needed if their research were conducted at CES headquarters.

CES and the expanding RDC system together are developing a group of microdata researchers with expertise using Census Bureau data. These projects also foster microdata training for the graduate students associated with them, including a specialized class begun in January 2005 team-taught by members of the RDC network, led by Professor John Abowd of Cornell University. As these students move on in their careers, they widen the range of expertise from which RDC research program can draw. Both groups of experienced researchers also enhance the quality of research and information their projects yield because they can "hit the ground running" in subsequent approved projects.

The rich research program at the RDCs contributes profound new insights. The topics are more varied than those conducted by CES staff because research in the RDC system increasingly draws on microdata from the Census Bureau's Decennial Censuses and household surveys. The internal household microdata at CES have some but not all of the information that is suppressed or omitted in public-use files to protect respondent confidentiality (e.g., detailed geography and occupation, income that is not top-coded). Research using those data is not

always easy since the internal versions of these files often have different structures than the public-use files, and sometimes lack user-friendly documentation.

Research topics at RDCs include pollution abatement costs; financial consequences of corporate governance; the effects of social welfare programs on the health, income, and welfare of the population and specific groups, such as immigrants; and the evolution and structure of regional economic markets. The expanded RDC program further enriches the returns that research using Census Bureau microdata yields to the Census Bureau, the U.S. and international statistical systems, and public and private decision makers.

In addition to administering the RDCs and its own research program, CES supports federal statistical programs in a number of ways. The primary way is through direct support of Census Bureau statistical programs. For example, CES and the Bureau of Labor Statistics have undertaken a project to examine the business registers of the two agencies. The comparison is expected to improve our understanding of the registers and help in interpreting differences in data collected by both agencies. The comparison may also provide the information needed to support a practical data sharing arrangement between the two agencies that could reduce reporting burden on the business community, reduce each agency's cost of maintaining its register, improve the quality and efficiency of Federal business statistics, and benefit the research, policy, and measurement communities. CES staff also provide direct support through research and technical expertise to the routine operations of two surveys: the Pollution Abatement Costs and Expenditures survey conducted for the Environmental Protection Agency; and the Medical Expenditures Panel Survey—Insurance Component conducted for the Agency for Health Care Research and Quality. At the request of the National Science Foundation, CES staff in 2005 will begin to support the Industrial Research and Development Survey. CES also supports researchers in the Census Bureau Research Fellowship Program.

CES and the RDC system serve other Federal agencies. For example, researchers from the Federal Reserve Board of Governors use CES data to carry out studies in support of the Board's data programs, such as the Industrial Production Index. Joint work between researchers from CES and the Board reclassified each Census of Manufactures from 1992 to 1963 from the Standard Industrial Classification to the new North American Industrial Classification System (NAICS). This reclassification yields historic data that are consistent with data collected under NAICS. The Board of Governors, the Bureau of Economic Analysis, and the Bureau of Labor Statistics have used these data.

CES supports Federal and international statistical programs through research projects that are of broad interest to the statistical measurement community. The work of CES researchers frequently features in forums addressing fundamental measurement issues in Federal statistics, such as the NBER's Conference on Research in Income and Wealth, including the April 2005 CRIW Conference "Producer Dynamics: New Evidence from Microdata," and the Commerce Department's May 1999 conference on "Measuring the Digital Economy." CES researchers participate in forums addressing measurement issues of interest to the U.S. and other national statistical agencies, such as the Committee on Industry and Business Environment and the Working Party on Indicators for the Information Society of the Organization for Economic Cooperation and Development (OECD).

The CES and RDC research programs rely on high-caliber professional support from computer, data, and administrative staff at CES. They work hand-in-hand with CES research staff to acquire new data, update and maintain secure state-of-the-art computing infrastructures, and develop and maintain the multiple administrative systems needed to meet security and policy requirements and manage the project process from proposal submission to project close-out. The CES Data Staff regularly update the series in CES's holdings as new data become available. They also add new data series. Data sets added since 2000 include: the Annual Capital Expenditures Survey; the Asset and Expenditure Survey; the Business Expenditure Survey; Census 2000; crosswalk files between the Survey of Income Program Participation, the Current

Population Survey, and administrative files; a crosswalk file between Compustat data and the Business Register; the Longitudinal Business Database; firm-level files from the Longitudinal Employer-Household Dynamics program; the National Longitudinal Surveys of Mature Men, Mature Women, Young Men, and Young Women; the Ownership Change Database; and the Survey of Plant Capacity Utilization.

The RDC research program also depends on the support of the CES professional staff that manages the proposal and project processes. The challenge of managing these processes continually increases as the number of sites in the RDC system expands, and new internal micro datasets and databases become available. 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. But the success of the CES and RDC research programs reflects their continuing contributions. The full CES staff roster is in Appendix 5 of this report.

The cooperation and support of the Census Bureau's business and household program areas are integral to the success of the CES and RDC research programs. 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.

The RDC network is a partnership with major universities and non-profit institutions. The continuing support and active contributions of these institutional partners is essential to the successful functioning of the RDC system.

¹ R.H. Coase, "The Industrial Structure of Production," *American Economic Review* 82(4), September 1992, 713-719.

² García-Castrillo, A. Montañes, and F. Sanz- García, 2002, "A worldwide assessment of scientific production in economics (1992-1997), *Applied Economics*, Vol. 34.

Center for Economic Studies Research Improves Census Bureau Data and Information

Introduction

Empirical analyses conducted by Center for Economic Studies (CES) staff researchers address a broad range of current and emerging issues about the U.S. economy and population. The research leverages the considerable resources the Census Bureau spends collecting and processing the microdata underlying major economic and social statistics. Using existing data to examine a dynamic economy and society:

- Fills some gaps in existing official statistics;
- Changes understanding of underlying economic and social processes;
- Assesses the quality of current microdata;
- Highlights gaps in existing data;
- Suggests directions for improving and enriching data collections.

CES Research Areas

This chapter highlights some recent CES research findings in nine broad areas:

- Business Demography and Dynamics
- The Digital Economy
- Employee Compensation
- Energy
- International Trade and Finance
- Microeconomic Foundations of Macroeconomic Statistics
- Migration
- Pollution Abatement Expenditures
- Regions

These research areas are fluid, changing with the availability of data, new economic and social concerns, and researcher and professional interest. CES researchers draw on a broad range of interactions with decision makers and researchers in the United States, other countries, and international organizations. CES researchers are invited to present their findings at major professional conferences around the world. Their work has been published in leading journals in their disciplines, such as *The American Economic Review*, *The Journal of Political Economy*, and *The Review of Economics and Statistics*. Their work also is published in leading journals in specialized fields, such as *The International Journal of Industrial Organization*, *The Journal of Environmental Economics and Management*, *The Journal of Human Resources*, *The Journal of Labor Economics*, *The Journal of Official Statistics*, *The Journal of Urban Economics*, and *Rural Sociology*. CES staff research also has been published as chapters of books by *The University of Chicago Press*, *The MIT Press*, *Oxford*

University Press, Cambridge University Press, Elsevier Press, and Ashgate Publishing. A full list of 2000-2004 publications and working papers is in Appendix 1.

CES researchers often capitalize on their ability to link internal microdata about specific economic units over time – that is, to create longitudinal data. Longitudinal data allow them to examine the dynamics of business demography – the birth, death, entry, and exit of business units into industries and sectors. Exploring the microeconomic underpinnings of macroeconomic statistics is a theme. This long-standing line of research at CES shows that the economic behavior of businesses within and between industries is diverse, shattering the concept of a “typical” business whose behavior explains changes in aggregate statistics. A parallel theme examines the characteristics of businesses that tend to cluster in different geographic regions.

Some projects take advantage of the large sample sizes underlying aggregate statistics to examine economic behavior in specific industries or sectors, such as manufacturing or retailing. Other studies focus on specific kinds of economic behavior, such as making investments to abate pollution, using specific kinds of energy as inputs to the production process, or participating in international trade.

New and emerging issues about the use of information technologies and their impact on productivity are the focus of another major strand of CES studies. Another group of projects examines factors determining worker compensation. A final research thread addresses individual rather than business behavior, examining the movement of individuals across geographic regions of the United States, and changes in the demographic composition of those who migrate.

CES Research and Census Bureau Data

CES staff research contributes directly to the Census Bureau’s data collection efforts. It draws on existing Census Bureau data collections and affects future data collections. Researchers frequently combine many Census Bureau microdata series to create a database specifically to examine a set of topics. Many of the projects in this section are the fruit of recent work, such as the Longitudinal Business Database, or of databases, such the Ownership Change database, developed some time ago but in constant demand. Initial projects using new databases generally yield the first descriptive statistics about new areas and issues. Subsequent projects apply models and estimation techniques that are more sophisticated to test increasingly complex hypotheses.

By using existing microdata in their research, CES staff researchers can assess the quality of those data, and whether the data can be used to address current and emerging issues. CES researchers continually identify critical data gaps. These research findings contribute directly to the Census Bureau’s data collection efforts as CES researchers work closely with the Census Bureau staff that design, collect, and produce data series.

Business Demography and Dynamics

Do most businesses share similar economic characteristics? Are their economic time paths similar? These kinds of questions can only be addressed by microdata – data on particular businesses. Business dynamics – measures of the businesses entering and exiting markets – are found to be critical to understanding why economic performance differs among U.S. businesses. New research extends our understanding of business dynamics in several dimensions.

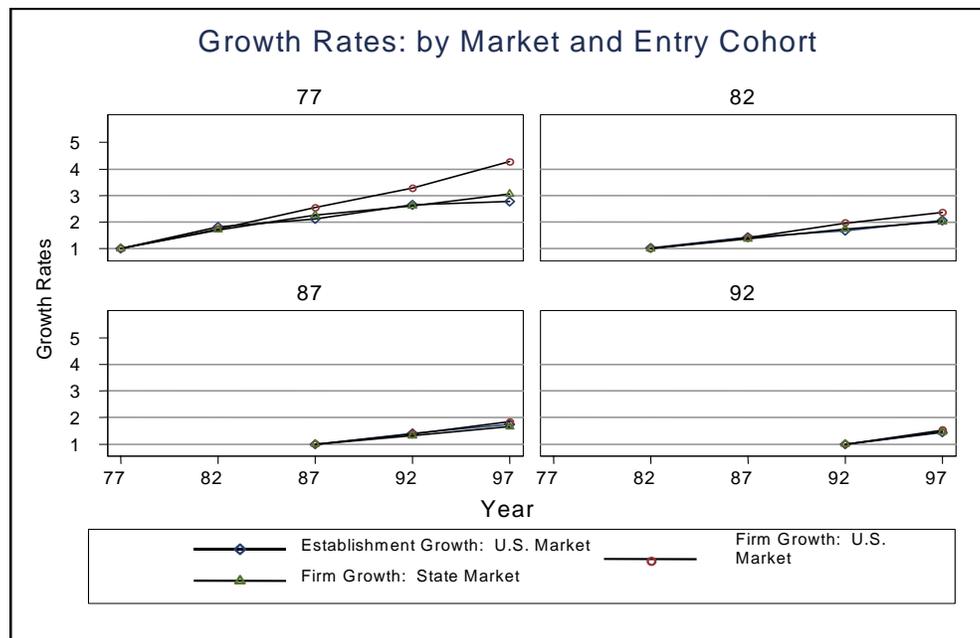
CES researchers use micro-databases developed at CES to address such questions. CES’s initial research on business dynamics was based on the Longitudinal Research Database (LRD), which was limited to manufacturing. Current studies use the new Longitudinal Business Database (LBD), which has annual observations for all economic sectors for 1975 forward.

One set of studies finds that different measures of “entry,” “exit,” and “markets” that the data allow researchers to create for U.S. businesses lead to different conclusions, suggesting that international comparisons of such behaviors will be difficult to make. A second group of studies examines factors causing a business to exit an industry. Exit depends on the business histories, not just their current characteristics, and on stages of the business cycle. A third set of studies examines the behavior of businesses without employees – non-employers or entrepreneurs – and finds that apparently “new” businesses with employees in fact began as non-employer businesses.

Broad Findings

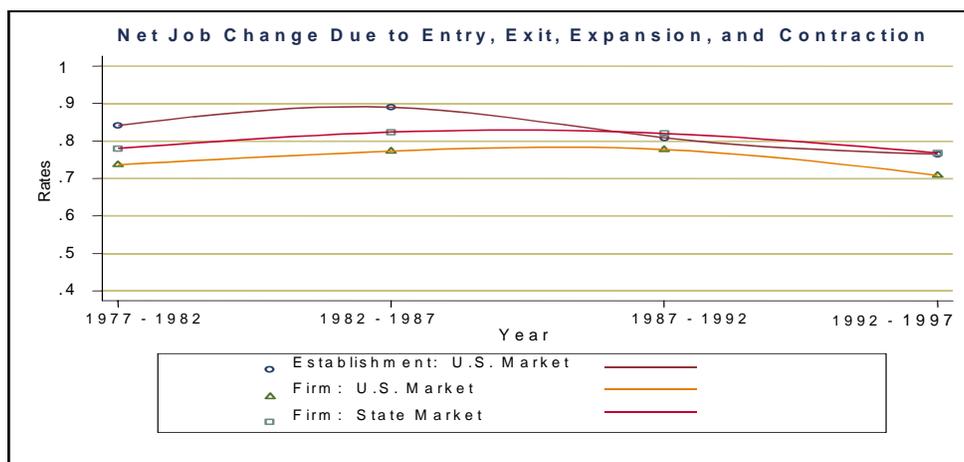
European and U.S. economic performances differed markedly in the 1990s. GDP grew about 3.1 percent per year in the United States, while European Union economies grew about 2.1 percent. Unemployment in the United States averaged 5.6 percent, half the European Union rate of 10.7 percent. What causes such performance differences? Previous CES research showed that measures of business entry and exit – business dynamics – are critical to understanding the sources of such differences in economic performance among U.S. businesses. Comparing statistics on business dynamics across countries is one way to address performance differences among countries. Miranda, Jarmin, and Sandusky (2003) used data for the United States to examine whether differences in measures of business demography among countries are likely to affect international comparisons. Statistics on business entry and exit, and job creation and destruction are created using alternative definitions. They find that differences in definitions matter. Measures of firm dynamics such as growth rates and net job change are sensitive to differences in definitions of the “markets” in which firms operate. This finding implies that comparisons between U.S. and European statistics on business dynamics require extreme caution. (See Figures 1 and 2.)

Figure 1. Different Definitions of Economic Unit and Market Yield Different Growth Rates



Source: Miranda, Jarmin, and Sandusky (2003).

Figure 2. Different Definitions of Economic Unit and Market Yield Different Trends in Net Job Change



Source: Miranda, Jarmin, and Sandusky (2003).

Producers entering a market can differ widely in their prior experience. They may have none, or it may be extensive, and may be in related geographic or product markets. Dunne, Klimek, and Roberts (forthcoming) develop ways to measure the prior experience of plants that enter markets. An establishment can have production experience in the industry or another industry, and the firm could have experience in the industry, another industry, or in the geographic market. Using plant-level data for seven regional manufacturing industries in the U.S., they find distinct patterns for three groups of plants: experienced plants that enter a market by diversifying their product mix; new plants owned by firms with experience in that market; and *de novo* entrants, and firms with experience in other industries or in the geographic market. While the decision to leave a market is related to current plant and firm characteristics and current and future market conditions, the plant's history also plays an important independent role in the decision. (See Table 1.)

Table 1. Experience at Time of Entry to Industry and Decision to Leave a Market

Survival Rates by Plant Age and Entry Type							
Experience of Entering Plant	Plant Age on Leaving Market						
	0-5	5-10	10-15	15-20	20-25	25-30	30-35
New Plants							
Firm experience in this industry	1.0	.602	.433	.321	.250	.208	.184
Firm experience in this industry and geographic market	1.0	.591	.427	.327	.242	.200	.141
<i>De novo</i> - No plant or firm experience in any manufacturing industry	1.0	.451	.260	.165	.109	.081	.061
Firm has other experience	1.0	.439	.266	.193	.121	.093	.059
Existing Plant That Enters by Diversifying Product Mix							
No experience in this industry	1.0	.473	.287	.189	.126	.086	.056
Experience in this industry	1.0	.463	.263	.174	.127	.085	.038

Source: Dunne, Klimek, and Roberts (forthcoming).

Are businesses more likely to close during periods of economic contraction? Does this likelihood persist over decades? Earlier work shows that manufacturing establishments were more likely to close during the expansionary period of the late 1980's than during the contractionary period of the early 1990's. New research examines establishment closing during the expansionary periods of 1987 and 1997 and the contraction of 1992 (Nucci 2001). The probability of establishment dissolution declines with age in each of the three years and the shape of the failure distributions are

broadly the same for broad industry sectors, regions, and most employment size classes. The findings for the expansionary period of 1997 answer the question whether the previous findings are anomalous by showing that establishment closure is once again elevated over that of the 1992 period. However, the 1997 findings are not as clear-cut as those of the earlier expansion. The probability of dissolution in the first years after formation differs for establishment subpopulations defined by characteristics such as industry, region, corporate affiliation status, and employment size class. These differences reflect changes in the industrial and ownership population across these three periods. (See Figure 3.)

Figure 3. Businesses Had Similar Rates of Dissolution in Recent Economic Expansions and Contractions

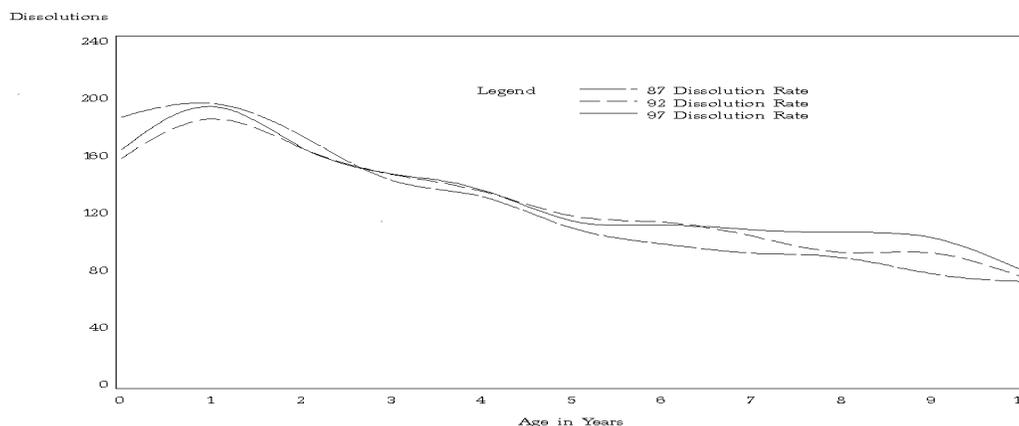


Fig. 1. 1987, 1992, and 1997 Age-Specific Dissolution Rates

Source: Special Tabulations, 1987, 1992, 1997 SSEL. Center for Economic Studies, Winter, 2002

Source: Nucci (2001).

Entrepreneurship and Small Businesses

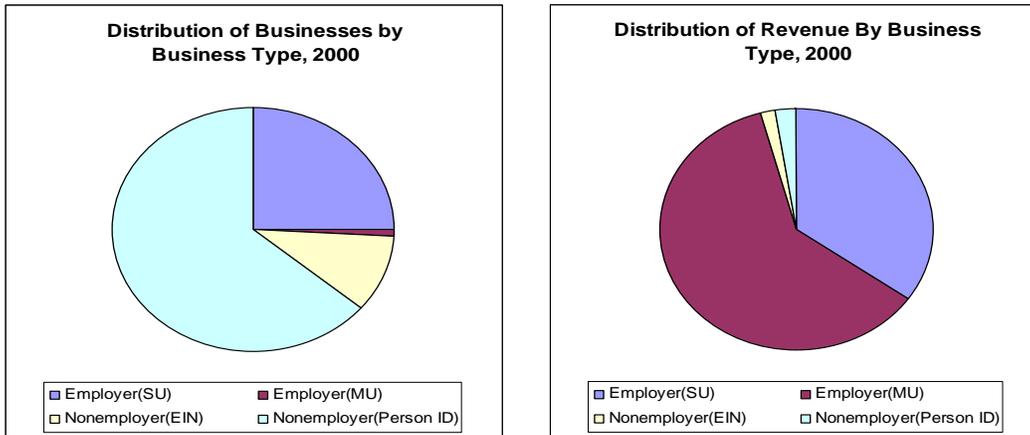
Research on business demography has been conducted for the most part on populations of businesses with employees. While this work has contributed much to our understanding of firm entry, survival, and closing, and covers the vast bulk of economic activity, it nevertheless remains a partial description of business populations. A substantial number of businesses without employees remain outside the scope of these studies. The dynamics of these firms is not well known and their role in the dynamics of employee businesses remains elusive.

CES researchers have developed a new microdata set, the Integrated Longitudinal Business Database (ILBD), that for the first time integrates business records for both employer and non-employer businesses. The former are businesses with paid employees while the latter are businesses without paid employees. The development of longitudinal business data on non-employers alone is of considerable interest. Integrating the two business universes offers even a richer picture of business dynamics. For example, we can ask whether the business dynamics of young employer businesses differs markedly from the business dynamics of young non-employer businesses. Moreover, we can examine their relationship to determine whether one of the paths to becoming an employer business is to first spend time as a non-employer business.

Initial work showed that many units moved between the employer and non-employer populations during the 1990s (Nucci and Boden 2003). New descriptive statistics from the ILBD present basic facts about employer and non-employer businesses (Davis, Haltiwanger, and Jarmin 2005). In the year 2000, there were roughly 21 million employer and non-employer businesses in the U.S. Figure 4 shows the distribution of firms and the distribution of revenue across these businesses.

The vast majority of businesses are non-employer businesses (roughly three-fourths) and most of these are sole proprietors (referred to as person ID businesses in Figure 4). For the employer businesses, most are employer businesses with one establishment (referred to as SU or Single-Unit businesses in Figure 4). Thus, most businesses in the U.S. either have zero employees or employ workers at a single location. However, Figure 5 shows that in terms of the distribution of revenue, firms that have multiple establishments (MU) account for more than half of all revenue. The sole proprietor non-employer businesses account for only a very small share of aggregate revenue.

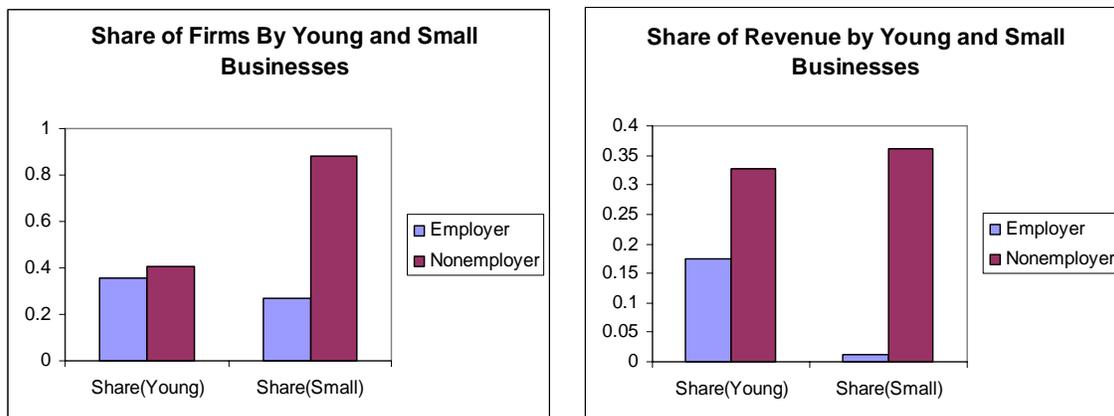
Figures 4 and 5. Most U.S. Businesses Have Zero Employees or Employ Workers at Only a Single Location, but Multi-Establishment Firms Account for More than Half of All Revenue



Source: Davis, Haltiwanger, and Jarmin (2005).

Another closely related set of basic facts is provided in Figures 6 and 7. Figure 6 shows the share of firms by young (defined as businesses as less than 4 years old) and small (defined as businesses with \$90,000 or less in annual revenue) for both the employer and non-employer business universes. Figure 7 depicts the share of revenue by young and small businesses in the employer and non-employer business universes. From Figure 6, it is clear that in both the employer and especially non-employer universes, a substantial fraction of businesses are young and small. However, Figure 7 makes clear that in the employer universe in particular, the share of revenue accounted for by young and small businesses is relatively small. In the non-employer universe, the share of revenue accounted for by young and small businesses is larger but recall from Figure 5, the share of overall revenue accounted for by non-employer businesses is small.

Figures 6 and 7. A Substantial Share of Employer and Non-Employer Businesses Are Young and Small, but Young and Small Businesses Account for a Larger Share of Non-Employer Revenues



Source: Davis, Haltiwanger, and Jarmin (2005).

The patterns in Figures 4-7 reflect the enormously skewed size distribution of activity at U.S. businesses. The vast majority of businesses are small and many of these small businesses are young while most activity is accounted for by large and more mature businesses. The sheer number of non-employer businesses suggests it is important to study them. Second, young and small businesses may be especially important for understanding the dynamics and growth of the economy. Finally, an open question is how the large and mature businesses became large and mature – in particular, what is the role of young, small and perhaps non-employer businesses in business formation and growth?

Preliminary evidence shows that it was important to develop these data to understand dynamics. It turns out that young businesses are not only very dynamic on average but, perhaps not surprisingly, very volatile. The volatility of non-employer businesses declines more sharply with business age and the volatility of non-employer businesses is substantially higher for all age groups. The churning of business activity across firms is a ubiquitous feature of the U.S. economy and it is striking that it is especially high among young businesses in general and non-employer young businesses in particular.

How do these two business universes connect? Preliminary evidence suggests that while the vast majority of non-employer businesses are not connected to and do not transit to become employer businesses, a small but important fraction of businesses make that transition. While the shares are modest, it is important to remember these are shares of a very large base.

The Digital Economy

How much does information technology (IT) affect the U.S. and other economies, and how? CES researchers join researchers in the United States and around the world in addressing these questions. A series of CES research initiatives tackle different aspects. CES researchers also contributed to developing new data, both in the United States and internationally, to better assess IT's impacts on economic performance.

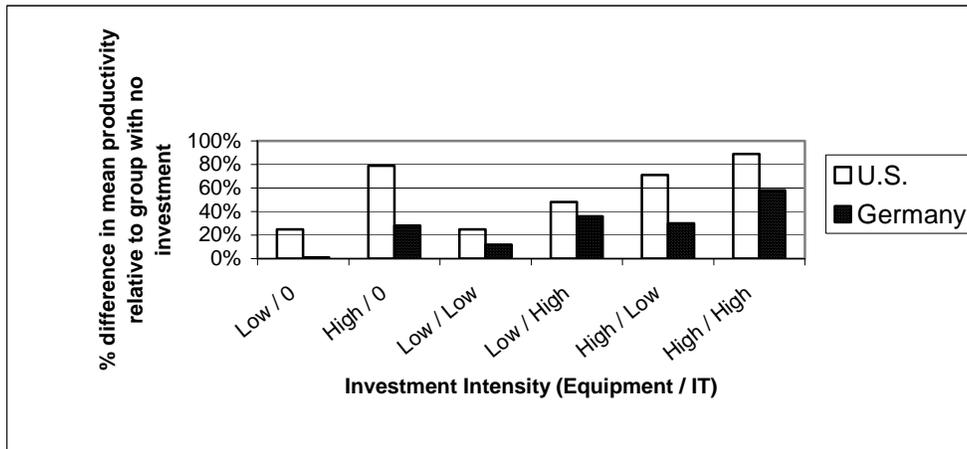
Does the Business Environment Matter? – International Comparisons

Although researchers have found evidence of the impact of IT on productivity at the microeconomic level across many countries, the impact on aggregate productivity and economic growth has varied across countries. This is true even though IT is universally available in developed countries. While the U.S. and a few other economies enjoyed the boom of the late 1990's, many European economies experienced sluggish growth. Several explanations have been put forward, including differences in the policy and institutional settings across countries, measurement issues, and time lags (microdata research showed positive impacts of IT in the United States before aggregate statistics). Some have hypothesized that the U.S. economy was able to use the new general-purpose technology of IT more effectively because its regulatory and institutional environment permits firms to experiment more. An important component of the U.S. ability in this regard is the efficient reallocation of resources away from firms whose experiments in the marketplace fail, to those whose experiments succeed. Several CES research projects contribute to this discussion.

The Organization for Economic Cooperation and Development (OECD) Growth Project provided a comprehensive analysis of the impact of information and communication technology (ICT) on productivity and economic growth in several OECD countries, using aggregate, industry-level, and plant-level data. It found evidence that the Schumpeterian processes of churning and creative destruction (or market selection) yield greater economic impacts in the United States than in other OECD countries. These processes affect aggregate productivity growth as lower productivity firms shrink and exit and higher productivity firms enter and grow. Is it the case that IT has had a greater impact on business performance in the United States because the U.S. policy and institutional environment is more conducive to market selection and learning?

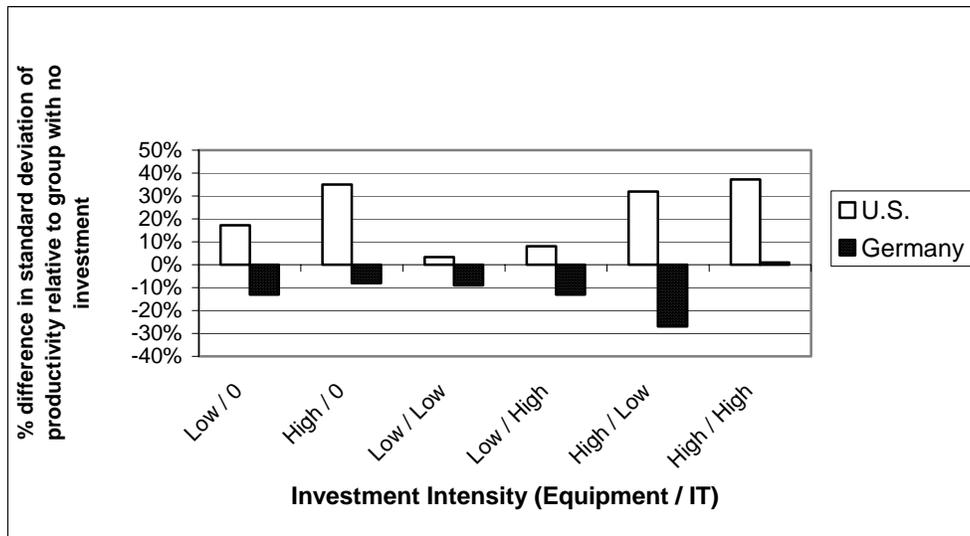
Recent research using microdata from the United States and Germany attempts to address this question (Haltiwanger, Jarmin, and Schank 2003). The analysis first compares differences between various groups of manufacturing establishments (e.g., young vs. old, or those investing heavily in IT vs. those that do not) within each country. These differences are then compared across the two countries. The comparison allows the researchers to contrast the impact of IT on economic performance between the two countries. The results suggest that U.S. manufacturing establishments benefit more from investing in IT and are more likely to experiment with different ways of conducting business than their German counterparts, even after controlling for several plant-specific factors such as industry, age, size and so on. (See Figures 8 and 9.)

Figure 8. U.S. Firms Investing Heavily in IT and Other Capital Have Higher Productivity Premiums



Source: Haltiwanger, Jarmin, and Schank 2003.

Figure 9. U.S. Firms Investing Heavily in IT and Other Capital Experience More Varied Productivity Outcomes



Source: Haltiwanger, Jarmin, and Schank 2003.

Parallel analyses for the U.S., Denmark, and Japan find that IT is positively related to productivity in all three countries, but that the relationship depends on the type of IT used, the sector, and time period (Atrostic, Boegh-Nielsen, Motohashi, and Nguyen 2003). Early results for Denmark

show a significant correlation between several measures of the firm's performance and use of the Internet, but not for other uses of IT. For Japan, productivity levels are consistently higher for firms using IT networks. However, growth in labor productivity varies by type of network and how the network is used, and the impact of Internet use is higher for retail trade firms than for manufacturing firms. For U.S. manufacturing plants, there is a strong relationship between use of computer networks and labor productivity.

A more detailed comparative analysis (Atrostic, Motohashi, and Nguyen 2004) uses firm-level data to examine how specific information technologies, such as the presence of computer networks or different applications of computer networks, affect productivity in the two countries. The links between these information technologies and productivity differ between the U.S. and Japanese manufacturing sectors. Computer networks have positive and significant links with labor productivity in both countries. However, that link is roughly twice as large in the U.S. as in Japan. Differences in how businesses use computers, such as the intensity of network use, number of processes used, and the use of specific networked processes, have clear links with productivity for U.S. manufacturing, but not in Japan.

Does It Matter How Information Technology Is Used?

Businesses in the United States have used information technology (IT) for fifty years. Simply investing in IT may no longer provide a competitive advantage. What matters for economic performance may now be how businesses use IT. New data from the 1999 Computer Network Use Supplement (CNUS) to the 1999 Annual Survey of Manufactures (ASM) are beginning to be used in series of studies at CES to model how U.S. manufacturing plants use computer networks. Initial research finds that computer networks are widely diffused within manufacturing (Atrostic and Gates 2001). About half of all plants have networks, and the share of employment at plants with networks is almost identical in durable and non-durable manufacturing. Within those sub-sectors, there are substantial differences in shares of plants with networks.

Computer networks are found to have a positive and significant relationship to a plant's labor productivity (Atrostic and Nguyen forthcoming c). Productivity is about five percent higher in plants with networks, after accounting for multiple factors of production and plant characteristics in the current period. When current investment in computers, and economic characteristics in prior periods, is also accounted for, productivity continues to be significantly higher in plants with networks (Atrostic and Nguyen forthcoming a). These initial findings for the United States are consistent with findings for other countries in the OECD microdata project (Atrostic, Boegh-Nielsen, Motohashi, and Nguyen 2003).

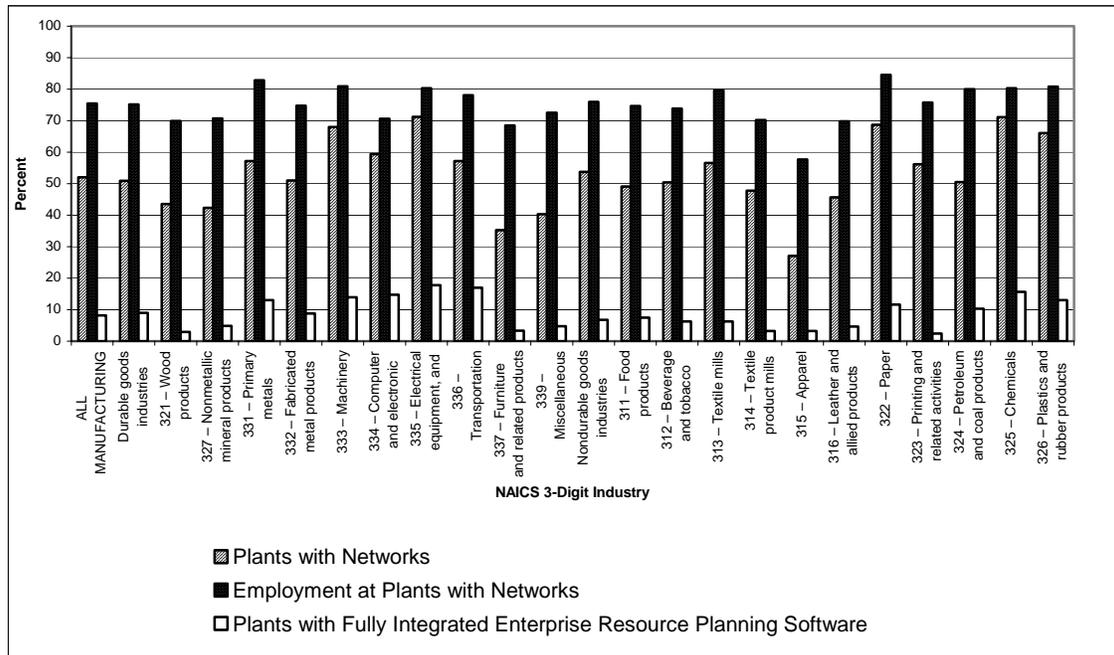
Do "good" plants use computer networks to retain their advantage, or do relatively poorly performing plants use networks in attempts to catch up? Prior CES research supported both hypotheses. The most recent research, using the 1999 data, finds that plants whose performance was relatively poor in prior periods are more likely to have networks now (Atrostic and Nguyen forthcoming c).

Does it matter how businesses use computer networks? Specific ways of using computer networks have distinct and positive relationships with labor productivity in U.S. manufacturing (Atrostic and Nguyen forthcoming b). Productivity is about 4.5 percent higher in plants using complex enterprise-wide software. On-line supply chain activities such as inventory, transportation, and logistics are associated with higher productivity, while on-line control of production processes is not. By contrast, research for some other countries suggests a strong productivity effect from using computers or on-line processes for core production processes. Using on-line processes for e-commerce activities, such as selling on-line, either has no significant effect, or only a very small one. This finding is consistent with recent research using similar data for the United Kingdom.

Research undertaken at the CES RDC suggests that IT needs to be used together with worker training, and revised workplace practices, to yield productivity gains. This line of research suggests that

IT is important, but that it makes its impact when accompanied by changes in other factors and practices. This research is described in Chapter 3.

Figure 10. Computer Networks Were Common in U.S. Manufacturing Industries in 1999, But Sophisticated Network Software Was Not



Source: Atrostic and Nguyen *forthcoming c* .

Does IT Have the Same Impact in All Sectors?

IT was widely expected to alter the structure of markets. The issues are scarcely settled. Aggregate level studies of productivity growth generally find that IT contributed significantly to the acceleration in productivity growth of the later half of the 1990s. The IT share of the capital stock grew rapidly in the 1990's, and therefore the IT contribution to productivity growth grew. Perhaps the biggest hurdle facing economists in examining the relationship between IT and productivity is that there is often a lack of appropriate data on IT, other inputs, and output. Many of the sectors where IT is used most intensively are where measurement by official economic statistics is the weakest. Retail trade is one such sector.

New research uses previously untapped micro level data collected by the Census Bureau to analyze firm performance in the retail trade sector, focusing primarily on the role of IT (Doms, Jarmin, and Klimek 2004). It extends to other significant portions of the economy the rich literature that uses Census Bureau microdata to analyze establishment and firm performance in the manufacturing sector. The study finds that large retail firms are more productive than small retail firms. Large retail firms benefit from increased spending on IT and high capital intensity, but small retail firms do not. Among large retail firms, IT intensity is an important contributor to productivity. Productivity growth was significantly higher in large firms when IT was a large share of their capital spending and the firms were capital-intensive.

The United States experienced a significant increase in wage inequality from the mid-1970s through the early 1990s. The difference in wages earned by a worker in the 90th percentile of the wage distribution compared to a worker in 10th percentile increased by 38 percent in the United States from

1971 to 1995.¹ What caused this increase in wage inequality? One hypothesis is skilled-biased technical change. That is, the introduction of advanced technologies and, in particular, the wide-spread diffusion computers increases the demand for skilled workers which, in turn, pulls up the wages of skilled workers relative to unskilled workers.

CES research sheds new light on the skill-biased technical change hypothesis (Dunne, Foster, Haltiwanger, and Troske 2004). Two related hypotheses are investigated. The first hypothesis is that most of the recent increase in the dispersion of wages and productivity occurred across, rather than within, establishments, and these changes in dispersion are linked. The second hypothesis is that the increased dispersion in wages and productivity across establishments is linked to differences in their rates of technological adoption.

Exploiting establishment-level data yields new insights that largely support these hypotheses. The research finds that the between-plant component of wage dispersion is an important and growing part of total wage dispersion. That is, much of the observed dispersion of wages occurs because wages differ between plants, rather than because wages are becoming more dispersed within plants. Although the share of employment and total production has shifted across industries, the between-plant increase in wage dispersion occurs largely within industries. Between-plant measures of wage and productivity dispersion have increased substantially over the last few decades. Finally, the research explores the role of computer investment. Differences in computer investment have economic consequences. Changes in the distribution of computer investment across plants, and changes in the wage and productivity differentials associated with that computer investment, account for a significant fraction of the rising dispersion in wages and (to a lesser extent) productivity.

Employee Compensation

What determines how much workers are paid? Do workers who change jobs typically increase their pay? What determines how much of worker compensation is in the form of wages, and how much is in non-wage benefits such as health insurance and pensions? CES researchers address these questions by developing several new micro-databases. These databases allow them to take into account more economic factors than generally are available to researchers. The initial analyses suggest that characteristics of both workers and employers determine the level of compensation and its composition.

Wages and Job Turnover

Changing jobs (worker turnover) and the compensation practices of employers can affect how young workers fare in the labor market. Empirical studies generally show that job turnover typically leads to substantial earnings gains early in a young worker's career. Such gains are consistent with economic theories of job search and matching. Underlying these models is the idea that workers learn gradually about their aptitudes, skills and interests. Over time, this knowledge leads to better job matches and improved earnings as they move from job to job. However, the mechanism through which job turnover benefits young workers can only be partially modeled when data lack detailed information about both workers and employers. A detailed data set with information about both allows a more complex picture of the labor market to be modeled (Miranda 2004).

Two aspects of the mechanism, the job search and matching process, are found to determine the wages of young men. The detailed data also allow the researchers to test whether these effects are the same for all workers and firms. They find a two-tier system. The effects of mobility on earnings vary with the characteristics of the worker and the employing firm. Workers with high skill levels tend to

¹ See, for example, Acemoglu, Daron, "Technical Change, Inequality and the Labor Market," *Journal of Economic Literature* 40(1) (2002), 7-72.

find stable jobs in firms and industries with high wages and low turnover, while those with fewer skills tend to find jobs in firms and industries with low wages and high turnover. Workers with high skill levels do not switch jobs frequently, but gain significantly when they do because they move into high-wage firms and industries. By contrast, workers with low skill levels switch jobs frequently, but do not gain as much because they cycle through a series of jobs in low-wage firms and industries.

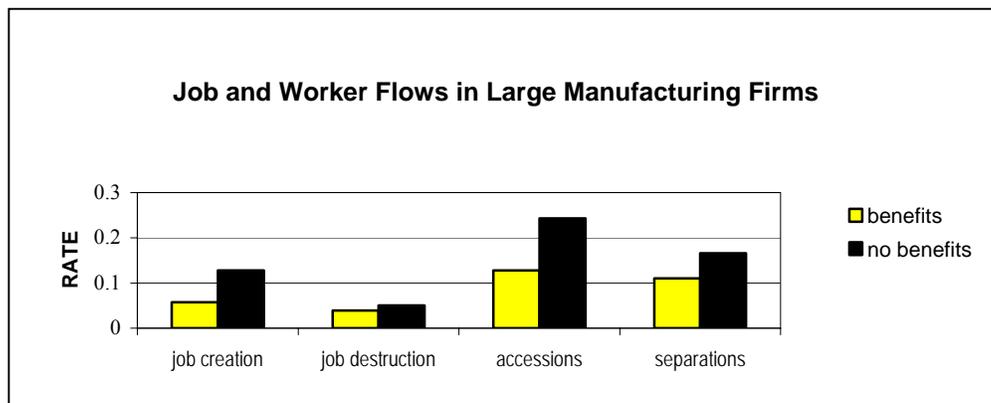
Non-Wage Compensation

Non-wage compensation such as employer-provided pensions and health insurance are of great interest both because of their effects on the labor market (e.g. worker turnover and retirement behavior) and their interaction with Social Security and Medicare. Understanding what determines the benefit plans an employer offers, and how those plans affect an employer's workforce requires data on both parties to the arrangement—firm and workers. Despite the importance of understanding these questions, good data remain scarce. CES research projects in this area link existing data to create new databases that allow them to address these critical issues.

One difficulty in developing good data is that workers have difficulty reporting plan details, while employers have difficulty giving detailed information about their employees. Research on this important aspect of employment therefore has been hampered by a lack of data combining detailed information on benefit plans with characteristics of employers and their employees. In a joint project between CES and the Longitudinal Employer-Household Dynamics (LEHD) program, researchers developed a new database that holds great promise for work in this area (Decressin, Lane, McCue and Stinson 2005). The database combines information from several sources for the 1990s. Detailed benefit plan data come from Internal Revenue Service Form 5500 (which employers generally must file for tax-preferred benefits such as health insurance and pensions). Firm characteristics are drawn from the Business Register and the Economic Censuses. Finally, data on the demographic and human capital characteristics of employees of firms in eight large states are drawn from the LEHD program's integrated employer-employee database.

The researchers have taken advantage of these rich new data to explore a number of relationships among the benefits firms offer; employer characteristics such as productivity, industry, and size; and workforce characteristics such as within-firm distributions of age, sex, wages, human capital, and turnover. Firms that offer benefits both have higher productivity and stay in business longer. These relationships come about in part because employers that offer benefits tend to have employees with more human capital and lower turnover, but worker characteristics do not fully account for the relationships (Decressin, Lane, McCue and Stinson 2005). (See Figure 11.)

Figure 11. Turnover Is Lower in Firms with Employee Benefits



Source: Decressin, Lane, McCue and Stinson 2005.

CES researchers created a second benefits database linking the Insurance Component of the Medical Expenditure Panel Survey (MEPS-IC) with data from the 1997 Economic Censuses (McCue and Zawacki 2004). The economic census data are used to construct productivity measures to augment the MEPS-IC data on employer-provided health insurance. An issue in any linkage is whether the linked sample remains representative and large enough to be useful, so the economic census data are attractive because most of the MEPS-IC sample can be matched to them. The researchers find high match rates and a sample that is representative enough to be useful.

The researchers use these data to address the relationship between health insurance and wages. Economists have often found a positive association between wages and health insurance, where theory would predict a negative one. One difficulty is that the relationship should be measured by comparing workers with similar levels of productivity, but only proxies for productivity, such as education and work experience, are available in most datasets. Workers that are more productive have higher overall compensation. These workers are also likely to want to receive more of their compensation in the form of health insurance, leading to an apparently positive relationship between wages and health insurance. The researchers use the measures from the economic census to directly control for productivity differences in regressions aimed at measuring the trade-off between wages and health insurance. The regression results support the idea that workers with good health insurance benefits partially pay for them through reduced wages.

As mentioned above, understanding employers' decisions regarding health insurance benefits for retired workers is of interest because of the relationship with Social Security and Medicare. Research at CES has explored factors related to manufacturing firms' decisions to offer and contribute to retiree health insurance (Born and Zawacki 2005). This paper uniquely links the MEPS-IC with the employer's financial performance measures developed with the Census of Manufactures, Medicare Managed Care Market Penetration Data from the Centers for Medicare and Medicaid, and Medigap insurance data that are based on tabulations from the National Association of Insurance Commissioner statistics. The findings indicate that the probability that a firm offers a retiree health insurance benefit is largely related to the age of the firm, and, given that a firm offers retiree health benefits, the firm's generosity in contributing to the premium is positively related to financial performance and the share of managed care in the local insurance market.

Increasing health care costs and health insurance premiums raise concerns that employers may reduce the share of the premium they pay. Research using the MEPS-IC, finds that there continue to be establishments that pay the full cost of health insurance for their employees (Zawacki and Taylor 2004, 2005). The research identifies the characteristics of these employers and the policies they offer. While single-unit and smaller establishments are less likely to offer insurance, these employers are more likely to pay the full premium than are multi-unit and larger establishments. In addition, unionized establishments are more likely to pay the full premium than are non-unionized establishments. Plans that are fully paid by employers tend to have less generous and more restrictive benefits. For example, such plans have higher maximum out-of-pocket payments, exclusive provider type arrangements, and require referrals.

Energy

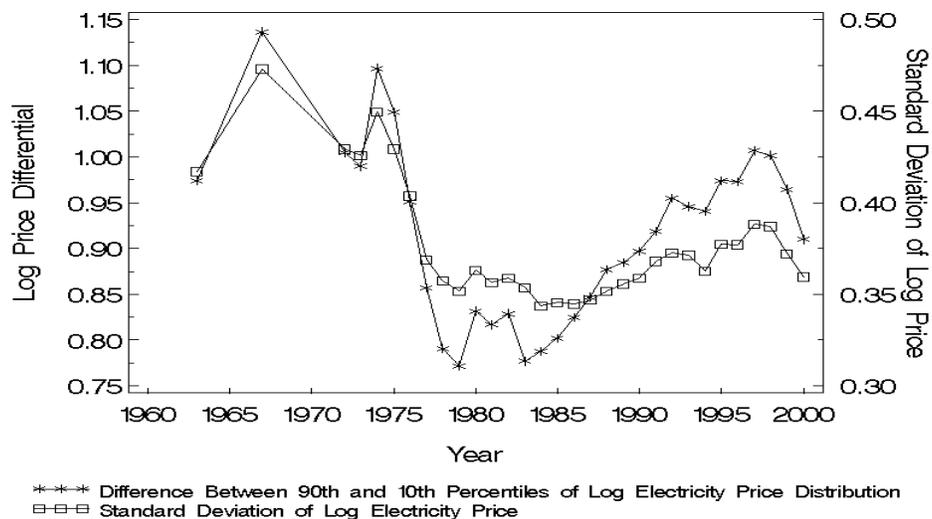
Energy is an important input for many U.S. manufacturing plants. Interest in the electrical sector's performance intensified following developments such as difficulties with attempts to restructure the electric industry in the 1990s, inadequacies in the electric transmission grid, and concerns about possible terror attacks on the infrastructure of the U.S. electric generation and transmission system.

Do plants pay similar prices for electricity? Have prices become more similar across regions over time? Prices might be expected to converge because the national electricity transmission grid was improved and because of government-promoted competition in wholesale and some retail markets during the 1990s. To address such questions about the role of electricity prices and economic

performance, CES researchers constructed a plant-level database that includes information on purchased electricity and electricity expenditures for more than 48,000 plants per year and additional data on the utilities that supply electricity (Davis, Grim, Haltiwanger, and Streitwieser 2003).

The dispersion of electricity prices decreased substantially between 1963 and 1978. This compression reflects a dramatic erosion of quantity discounts given by electric utilities. Despite the price compression observed through 1978, marked differences across the U.S. in the spatial distribution of electricity prices continued throughout the 1980s and 1990s. Indeed, the spatial dispersion in electricity prices across states and counties since 1978 has been relatively stable. A significant portion of the continuing dispersion can be attributed to state-level differences in the fuel source mix used to generate electricity. For example, electricity tends to be cheaper in states in the Pacific Northwest, where the main fuel source used to generate electricity is hydropower, than in states in the Northeast, where the main fuel source is petroleum. (See Figure 12.)

Figure 12. Electricity prices paid by U.S. manufacturing plants converged sharply in the 1960s and 1970s



Source: Davis, Grim, Haltiwanger, and Streitwieser 2003.

International Trade and Finance

CES supports an innovative research program exploring the impact of international trade on the U.S. economy. This productive program is now a decade old. It has had a significant impact on both trade policy practitioners (as evidenced by a number of microdata study results making their way into the mainstream trade debate) and theoretical trade economists (as evidenced by a citations in recent theoretical trade papers in journals such as the *American Economic Review* and *Econometrica*). Further, the empirical microdata research supported by CES has been highlighted in a U.S. International Trade Commission report to Congress (as required by the 2002 Trade Act) "The Impact of Trade Agreements" (investigation number TA-2111-1).

U.S. exports grew at a rate of 10.3 percent per year from 1987-1992, far faster than the economy as a whole and faster than in any other five-year period since 1960. What determines whether a business exports? What kinds of businesses contributed to the export boom during this period? Why? CES researchers used a panel of U.S. manufacturing plants to test for the role of plant characteristics, spillovers from neighboring exporters, entry costs and government export promotion expenditures in a plant's decision to export (Bernard and Jensen 2004a). Entry and exit in the export market by U.S. plants is substantial, past exporters are apt to reenter, and plants are likely to export in

consecutive years. The costs of exporting are significant determinants of the decision to export, and spillovers from the export activity of other plants are negligible. State export promotion expenditures have no significant effect on the probability of exporting. Plant characteristics, especially those indicative of past success, strongly increase the probability of exporting, as does changing industries.

Exports typically increased because existing exporters increased the intensity of their export activity, rather than because new businesses decided to begin exporting (Bernard and Jensen 2004b). The small role of entry relative to export intensity is consistent with the findings that the substantial costs of learning the hurdles involved in beginning to export are important factors in businesses' decisions about entering the export market. The researchers also consider competing explanations. They conclude that changes in exchange rates and rises in foreign income were the dominant sources for the export increase, while productivity increases in U.S. plants played a relatively small role.

How do these analyses of the factors determining a plant's decision to export, and the intensity of its export activity, fit with standard theories of international trade? One study bridges the gap between standard macro-level trade theory with observed plant-level export behavior (Bernard, Jensen, and Kortum 2003). It extends the standard formal model to accommodate many countries, geographic barriers, and imperfect competition. The extended model captures qualitatively basic facts about U.S. plants: (1) productivity levels that vary tremendously among plants in an industry, (2) higher productivity among exporters, (3) the small fraction who export, (4) the small fraction of earnings attributable to exports among exporting plants, and (5) the size advantage of exporters. Fitting the model to bilateral trade among the United States and 46 major trade partners, the research examines the impact of globalization and dollar appreciation on productivity, plant entry and exit, and labor turnover in U.S. manufacturing.

Microeconomic Foundations of Macroeconomic Statistics

How do the economic relationships observed in CES studies based on microdata fit with macroeconomic economic statistics? Do the microdata explain shifts in aggregate statistics? Does aggregating the microdata yield the macroeconomic statistics, and if not, why? An active CES research program addresses the fit between microdata on businesses and macroeconomic statistics. Current CES research sheds light on this fit for productivity growth in the retail sector, for decomposing the sources of changes in aggregate productivity statistics, and for measures of capital stocks and flows. Other CES research seeks to understand the persistence of productivity shocks measured at the plant- versus industry-level. Another project is underway to compare the business lists that underlie Census' and BLS's aggregate statistics.

Sources of Productivity Growth in Retail Trade

Are new businesses more productive than existing businesses? Do establishments that are more productive tend to replace less productive ones in the same industry? Or does productivity growth for an industry result from the establishments within it all becoming more productive? Understanding the underlying pattern of such resource reallocations is important to understanding the sources of productivity growth. It affects how we model and interpret aggregate productivity dynamics. It also can show whether market structure and institutions affect the reallocation's magnitude and efficiency. Most evidence to date for the U.S. and other countries comes from a single industry: manufacturing. Building on a unique establishment-level data set of U.S. retail trade businesses, a recent CES study provides some of the first evidence on the connection between reallocation and productivity dynamics in a non-manufacturing sector (Foster, Haltiwanger, and Krizan 2002).

Retail trade is a particularly appropriate industry to study. This large industry lies at the heart of many recent technological advances, such as e-commerce and advanced inventory controls. The study finds that virtually all of the productivity growth in the U.S. retail trade sector over the 1990s came

about because establishments that entered the industry were more productive, and these entering establishments displaced much less productive establishments, which exited the industry. In contrast, while entry and exit are important components of aggregate productivity growth in the manufacturing sector, they are not as dominant as they are in the retail trade sector. Much of the entry and exit activity that reallocates resources among establishments occurs within firms rather than between them. (See Table 2.)

Table 2. Gross Reallocation of Employment for Selected Industries, 1987–1997

Gross Reallocation of Employment for Selected Industries, 1987-1997					
Panel A: Gross Reallocation Rates					
Industry	Creation Rate	Destruction Rate	Net Flows	Excess Reallocation	
Department Stores	56.4	35.0	21.4	70.0	
General Stores	79.1	54.5	24.6	109.1	
Catalog Houses	100.0	50.2	49.8	100.4	
Panel B: Shares					
Industry	Share of Creation Due to Entrants	Share of Entry-Induced Creation from New Firms	Share of Destruction Due to Exits	Share of Exit-Induced Destruction from Exiting Firms	Fraction of Excess Reallocation Within Firms
Department Stores	0.79	0.04	0.63	0.36	0.48
General Stores	0.83	0.21	0.85	0.61	0.15
Catalog Houses	0.72	0.79	0.90	0.59	0.14

Source: Foster, Haltiwanger, and Krizan 2002.

Are Entering Plants More Profitable or More Productive?

A pervasive finding in the literature that uses business microdata is that firm turnover is high and that this churning process contributes substantially to aggregate (industry) productivity growth, as entrants that are more productive appear to displace less productive exiting businesses. However, establishment-level prices are typically unobserved. As a result, within-industry price differences are embodied in productivity measures. If prices reflect differences in the market power of businesses, high “productivity” businesses may not be particularly efficient. In this case, the literature’s findings might be better interpreted as evidence of entering businesses displacing less *profitable*, but not necessarily less productive, exiting businesses. This distinction is important not only for the sake of understanding the positive features of selection, but the normative ones as well; whether selection is driven by efficiency or market power differences has important welfare implications.

Looking at physical and revenue-based productivity measures requires data on both establishment-level quantities *and* prices. The researchers find that physical productivity and prices exhibit considerable within-industry variation (Foster, Haltiwanger, and Syverson 2003). While this is consistent with the preceding literature for revenue-based total factor productivity measures, there are important differences. Entering businesses have lower or similar productivity to incumbents when using a revenue-based measure of productivity. However, this result (which other studies have found) masks two interesting effects. Analyses based on a physical quantity measure of productivity find that entering establishments actually have higher productivity than incumbents and entering establishments charge lower prices for their output than do incumbents.

Aggregate productivity growth can be decomposed using the two alternate productivity measures. Net entry is an important component of growth of both productivity measures. However, the decompositions suggest that the existing literature may have overstated the contribution of net entry to productivity growth. The analyses also find that both productivity and price conditions affect businesses' survival probabilities. Lower productivity establishments and lower prices establishments are each more likely to exit. Controlling for both price and productivity effects reveals that both factors are important for survival.

Persistence of Productivity Shocks

Other research conducted at CES seeks to apply the insights of the literature on idiosyncratic shocks to individual labor productivity to the dynamics of plant-level total factor productivity. Storesletten, Telmer, and Yaron (2001) and others have characterized the time series properties of idiosyncratic shocks to labor productivity. Recent work in industrial organization emphasized the importance of firm- and plant-level heterogeneity in total factor productivity. For example, seminal work by Olley and Pakes (1996) has shown the importance of incorporating exit decisions when estimating plant-level productivity. Most of the work on plant- or firm-level productivity has focused on specific industries and used only cross-sectional data. Consistent establishment-level measures of the dynamics of total factor productivity across the entire economy are of interest to both macroeconomists and to applied microeconomists.

Ábrahám and White (2005) estimate establishment-level total factor productivity using a unique longitudinal data set that covers the entire U.S. manufacturing sector from 1976 to 1999. The time series properties of plant-level idiosyncratic shocks to productivity are characterized, taking into account aggregate manufacturing-sector shocks and industry-level shocks. Plant-level heterogeneity and shocks are a key determinant of the cross-sectional variations in output. The persistence and volatility of the idiosyncratic plant-level shocks are compared to those of aggregate productivity shocks estimated from aggregate data. Ábrahám and White find that the persistence of plant level shocks is surprisingly low—they estimate an average autocorrelation of the plant-specific productivity shock of only 0.37 to 0.41 on an annual basis. Finally, they find that estimates of the persistence of productivity shocks from aggregate data have a large upward bias. Estimates of the persistence of productivity shocks in the same data aggregated to the industry level produce autocorrelation estimates ranging from 0.80 to 0.91 on an annual basis. The results are robust to the inclusion of various measures of lumpiness in investment and job flows, different weighting methods, and different measures of the plants' capital stocks.

Capital Measurement

It seems natural that statistical agencies would strive for internal consistency between key macro- and microeconomic measures of business activity. That is, ideally, a given variable would be collected at the micro level (i.e., the firm or establishment level), either from the universe of businesses or from representative surveys, and macro level aggregates of that measure (i.e., at the industry or economy level) would be an appropriately weighted aggregation of the underlying micro data. Unfortunately, in the U.S., few key economic measures meet this ideal, with employment and payroll coming closest. Measures of capital stocks and flows certainly do not, with aggregate capital measures based on a top-down, supply side approach rather than bottom-up aggregation.

Recent research conducted at CES has explored the issue of capital measurement in the U.S. (Becker, Haltiwanger, Jarmin, Klimek, and Wilson, forthcoming). These researchers compare and contrast methodologies for the measurement of capital investment and the estimation of capital stock at the aggregate (i.e., industry and asset) level and the micro (i.e., firm and establishment) level. They examine the extent of micro/macro measurement inconsistencies and the associated limitations in measuring and interpreting capital dynamics at the micro and macro levels. This research used both aggregate data produced by BEA for the national accounts, as well as microdata from the Census Bureau's Annual Capital Expenditures Survey (ACES) and its Annual Survey of Manufactures (ASM).

In an effort to improve the measurement of capital stocks and flows by asset and industry, these researchers propose an innovative approach to allocating assets to industry, using detailed ACES microdata. The proposed methodology attempts to take advantage of the strengths of both the top-down and bottom-up approaches to capital measurement while minimizing (or at least adjusting for) the limitations of the two approaches. This “hybrid” approach holds great promise for improving the measurement of capital stocks and flows by asset and industry and in improving micro/macro consistency.

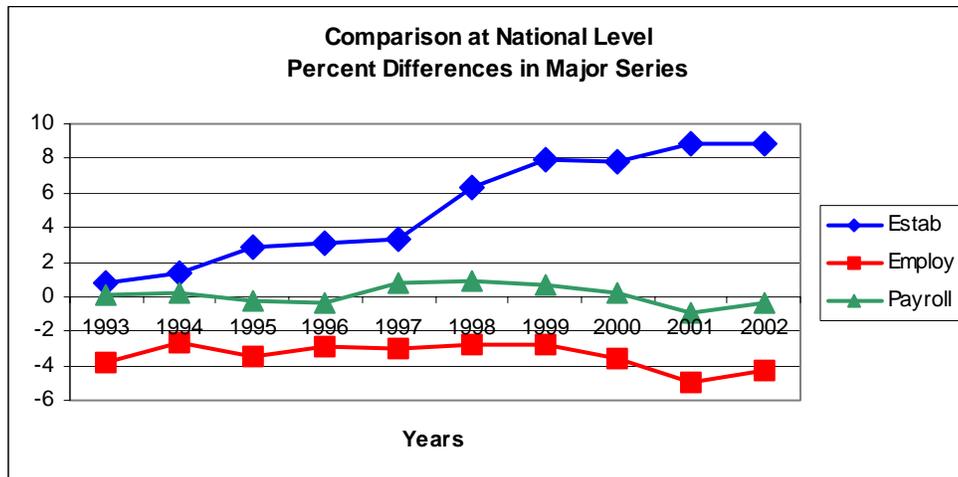
In using the (relatively new and unexplored) ACES microdata, the researchers also discovered a number of limitations with constructing capital data from the bottom up. For one, firms are asked to break out their capital investment expenditure by industry, and they often “truncate” the set of industries for which they report. For another, the expensing and leasing of capital assets pose challenging measurement issues, particularly for certain asset types and industries.

Business Register Comparison Project

The Bureau of Labor Statistics (BLS) and the Bureau of the Census (BOC) each hold separate list files of the universe of U.S. businesses created from independent sources. These business lists serve a number of critical functions including: (1) creating the sampling frames from which surveys and censuses are drawn, (2) providing the data for tabulations of the business universe for BLS’ *Employment and Wages Annual Averages* (Quarterly Census of Employment and Wages) and BOC’s *County Business Patterns*, and (3) providing aggregates from surveys and censuses drawn from the lists which are combined by agencies such as the Bureau of Economic Analysis to create national economic indicators. As such, these lists are of critical interest to microeconomists and macroeconomists alike.

In 2004, the BLS and the BOC initiated a joint project to examine the similarities and differences in the two registers and in their uses and to look for opportunities to improve the lists through data sharing. Using 2001 as a reference year, the comparison project will focus on differences in employment, payroll, and industrial and geographic classifications. The project will also analyze differences in the dynamics of the two lists by comparing the timing of births, deaths, and reorganizations over the two lists for the reference years 2000-2003. The project has started with a comparison of the two lists at the aggregate level. Analysts have compared the number of establishments, employment, and payroll using published data for the entire U.S. private economy and by industry and by state. Figure 13 shows that two registers track fairly closely in terms of payroll, but BOC’s register contains fewer establishments but more employment. Using the differences at the aggregate level as a motivation, the paper will compare the lists at the microdata level.

Figure 13. Comparing Major Series from Published BOC and BLS Data



Source: *County Business Patterns* and *Employment and Wages Annual Averages*.

Migration

Why do people move within the U.S.? Which kinds of people move? Do they move from rural to urban areas, or from urban to rural areas? Do observed trends persist over time and over geographic areas? A continuing CES research area addresses these and other questions about population migration in the United States, using internal household microdata, including decennial censuses and the Current Population Survey. Recent papers explore migration of persons not born in the U.S. (the “foreign-born”). Native and foreign-born groups migrate to different locations within the United States, but migrate for similar reasons.

How much of the population of a given region or county is composed of persons born in the U.S. versus the foreign-born? Do both groups have similar migration patterns within the U.S.? Are the foreign born more likely to be in metropolitan areas? Recent research examines the increasing presence of the foreign-born in non-metropolitan areas. The population of some U.S. counties was stable only because of growth in local foreign-born populations. From 1990 to 2000, there were 89 such counties. Nearly two-thirds of these counties (59) were non-metropolitan, with a total population of roughly 1.3 million persons, and 30 were metropolitan counties, with a total population of 24 million persons. The researchers compare and contrast these two groups of counties where population decline was “offset” by growth in the numbers of foreign-born (Nucci, Donato, Tolbert, Kawano 2003).

Do native and foreign-born persons move for the same reasons? Research by Schachter, Long, and Nucci (2001) examines this question. It presents some new “stylized facts” about reasons for moving for both groups. Logistic regression models test whether being native or foreign-born raises the likelihood, net of other variables, that survey respondents cite a work-related reason for moving. The researchers conclude that rates of moving and reasons for moving are similar for the native U.S. and foreign-born populations.

Pollution Abatement Expenditures

The effects of environmental regulation on firm behavior, including plant location, survival, investment patterns, operating costs, and environmental expenditures, have been examined in a series of papers using microdata from the Census of Manufactures and the Pollution Abatement Costs and Expenditures (PACE) survey (e.g., Becker 2005; Becker & Henderson 2000, 2001). A recent paper looks beyond formal regulation to see whether community characteristics play any role in what plants spend on pollution abatement (Becker 2004).

A number of previous studies show that community characteristics impact a variety of environmental outcomes, such as local pollution levels and the location of noxious facilities. If certain population groups are exposed to lower levels of air pollution, two explanations are possible. The concentration of air polluters may be smaller in communities with lower levels of air pollution. Alternatively, plants in those areas may invest more in abating air pollution. This study examines factors affecting what plants invest in abatement, using plant-level data on manufacturing plants from the PACE survey. Plant-level operating costs of abating air pollution are modeled as depending on an array of community characteristics commonly used in this literature, while also controlling for plant characteristics as well as formal federal, state, and local regulation.

Local factors appear to affect what plants spend to abate air pollution. Plants located near populations with higher homeownership rates and higher per capita incomes spend relatively more than plants near populations with lower ownership rates and incomes. Plants in communities where manufacturing is a greater share of local employment spend less on pollution abatement, suggesting a local constituency that is more resistant to additional regulation. Political affiliation appears to play a role, with plants in areas with larger concentrations of Democrats having greater expenditures on air pollution abatement, all else being equal. However, the study finds little evidence that race and

ethnicity are related to the pollution abatement behavior of the most pollution-intensive facilities. The findings of this paper support those of a number of recent studies. (See Table 3.)

Table 3. Community Characteristics Affect Air Pollution Abatement (APA) Activity

Marginal Effects of Covariates on APA Operating Costs Per Dollar of Output[†]	
Homeownership	+10.6%
Manufacturing	-8.0%
Income	+13.5%
Democrats	+11.6%
Metropolitan area	+13.1%

[†]Percentage change in APA intensity is computed for a one standard deviation change in the respective variable, from the means of the variables, holding all other covariates constant. The effect of metropolitan area is computed for the discrete change (from being outside to inside an MSA).

Source: Becker 2004.

Regions

Do all businesses grow at the same rate in all geographic regions of the U.S.? Does the entry and exit of businesses vary by region? Does the productivity of businesses vary by region, even after taking account of other economic characteristics? A series of CES research efforts make use of detailed internal microdata to tackle such questions about the economies of regions, economic geography, and regional economics.

Appalachia

The Appalachian Region has long suffered from poor economic performance, measured over a variety of dimensions. CES research uses the Longitudinal Business Database, which covers almost the entire U.S. economy, to compare job and establishment creation in the Appalachian region with the rest of the United States.

Two indicators of the general economic health of a region are the rate at which new jobs are created and the quality of those jobs. Research examining both questions over 1982-1997 period develops a detailed portrait of establishment formation and attrition and job creation and destruction in the Appalachian Region (Foster 2003). The foremost finding is that Appalachia's establishment birth and death rates and job creation and destruction rates are low relative to the U.S. average. For example, the average U.S. job creation rate during the study period exceeds 45 percent, while the Appalachian job creation rate is 43 percent. Similarly, the U.S. job destruction rate is about 35 percent, while the Appalachian job destruction rate is about 33 percent. Even when controlling for other differences between Appalachia and the rest of the United States, job creation rates are 1.2 percentage points lower and job destruction rates are 3.4 percentage points lower in Appalachia.

The quality of jobs is measured by the average wage paid at the establishment. Here too there is cause for concern about the economic health of Appalachia. Wages are about 10 percent lower in Appalachia than in the United States even when controlling for differences in other characteristics across the two areas. This wage discrepancy has not narrowed over the time of the study. Moreover, new establishments have a similar wage gap. Employees at new establishments in Appalachia earn wages 10 percent less than at new establishments in the rest of the U.S.

Recent empirical work suggests that creative destruction – the mechanism by which the economic structure constantly reinvents itself as new products and processes replace existing products and processes – is an important mechanism in an economy’s economic growth. When this process is impeded, so is economic growth. The results can include depressed rates of job and establishment creation, the inefficient survival of low-productivity establishments, entry and exit of establishments that are inefficient in terms of their productivity ranking, and spurious reallocation of resources from high productivity activities.

Existing work has shown that the reallocation of resources in the Appalachian Region lags behind that of the rest of the U.S. The lower reallocation rates are particularly noticeable in the North and Central subregions of Appalachia, while the South subregion of Appalachia has reallocation rates similar to that for the U.S. Do these lower reallocation rates impact the productivity dynamics of these subregions? Research using the LBD combined with the Census of Retail Trade attempts to answer this question (Foster 2004). The research finds that the South subregion has relatively high reallocation rates and that reallocation is an important component of aggregate productivity growth. The Central subregion’s low reallocation rate appears to be mostly a function of the industry composition in the subregion. Reallocation is an important contributor to productivity growth in the Central subregion. The North subregion has strikingly low birth rates and job creation rates. The births that do occur in this subregion contribute significantly to aggregate productivity growth. On the other hand, the deaths in this subregion are not concentrated in low productivity establishments and hence deaths do not contribute as much to aggregate productivity growth. In short, the reallocation and productivity dynamics in the North subregion are consistent with an impeded creative destruction story. (See Tables 4 and 5.)

Table 4. Job Flows Vary Across Appalachian Subregions

Job Flows Comparison: All Sectors				
Subregions	Net Employment	Job Creation	Job Destruction	Reallocation
Difference in Aggregate Rates				
Central	-4.79	-3.85	0.94	-2.91
North	-6.49	-8.35	-1.86	-10.21
South	3.85	-0.88	-4.73	-5.61
Controlling for other Factors*				
Central	3.55	-0.84	-4.39	-5.23
North	-3.42	-5.55	-2.12	-7.67
South	7.76	3.16	-4.59	-1.43
* Factors include industry, branch activity, size, and years. All differences are statistically significant.				

Source: Foster 2003.

Table 5. Job Flows of Producer Services in Appalachia

Job Flows of Producer Services Comparison				
Subregions	Net Employment	Job Creation	Job Destruction	Reallocation
Difference in Aggregate Rates				
Central	-2.11	-9.61	-7.50	-17.11
North	-6.12	-9.16	-3.04	-12.20
South	9.35	4.68	-4.67	** 0.00
Controlling for other Factors*				
Central	1.66	-5.73	-7.39	-13.13
North	-2.00	-6.29	-4.30	-10.59
South	9.39	3.42	-5.97	-2.55
*Other factors include industry, branch activity, size, and years. All differences are statistically significant except when denoted by **.				

Source: Foster 2003.

Where Businesses Locate

Why do the headquarters of firms cluster in cities? Two threads of the urban and regional economics literatures examine alternative reasons why scale economies lead to such clustering. Traditional urban systems models, consistent with empirical evidence for manufacturing, show that plants produce more productively when other plants of the same industry exist nearby. Knowledge spillovers among neighboring plants are one kind of scale economy of location that may lead to the industry cities (textile, steel, auto and so on) that we observe. The new economic geography literature offers another explanation. Scale economies may occur when a diverse mix of local industries exists, such as business and financial services, that can provide the intermediate inputs needed by headquarters operations.

Empirical estimates of knowledge spillovers and the diversity of local markets for intermediate inputs are developed from the Census of Auxiliaries and Administrative Establishments (Davis and Henderson 2004). The analysis finds that both kinds of externalities are important reasons why headquarters cluster in cities. However, the strong presence of headquarters in the very largest cities, such as New York, is explained more by the incredible concentration of business and financial services there. This study is one of the first to examine clustering and the role of scale economies for an industry in the services sector. It finds that within-industry knowledge spillovers are more important for service industries than for manufacturing. (See Table 6.)

Table 6. Importance of Out-Sourcing to Headquarters Units in 1997

Percent of Headquarters Units that Out Source	
	Propensity
Accounting	58%
Legal	64%
Advertising	54%

Table 6 (continued)

Out-Sourcing Expenditures as Fraction of Headquarters Wage Bill For Units That Outsource	
	Expenditures
Accounting	13.4%
Legal	15.2%
Advertising	36.6%

Source: Davis and Henderson 2004.

What determines whether a firm has a headquarters or other central administrative office that is separate from its operating establishments? When there is a central office, is it physically located near the operating establishments, or elsewhere? Additional CES research using the Census of Auxiliaries and Administrative Establishments explores economic and location relationships between these two kinds of units within firms (Aarland, Davis, Henderson and Ono 2004). Firms are more likely to have central administrative offices if they are large; are manufacturers, retailers or wholesalers; are industrially diversified; are geographically dispersed; and if their main production facilities are in smaller cities. Opening and closing rates are high for central administrative offices, and the sizes of new and closed offices are large, compared to findings for manufacturing. The size difference may be due to the low fixed costs of setting up a central office facility. It also indicates that large, mature firms continually experiment both in using central offices and in where they choose to locate them.

Location of Financial Services

Access to financial services is thought to be vitally important for new business growth. With the many legal and structural changes in the U.S. financial services sector over the last 30 years, there is concern about negative impacts on the economic development of certain areas. Using data from the Longitudinal Business Database, linked to the Small Area Income and Poverty Estimates, Riggs (2004) analyzes this sector and, in particular, the location of various financial services with respect to poverty levels, population, and other demand-side factors. The analyses look at both the "traditional" banking sector as well as moneylenders typically outside the mainstream financial sector. She finds that, from 1989-1997, commercial banks (SIC 602), savings institutions (SIC 603), and credit unions (SIC 606) generally locate as expected: there are greater shares of establishments in counties with lower poverty levels, even after controlling for population and market size. Meanwhile, personal credit (SIC 614), business credit institutions (SIC 615), mortgage bankers and brokers (SIC 616) tend to locate in higher poverty counties.

RDC Research Complements and Parallels CES Staff Research

Introduction

The rich research program at the Research Data Centers (RDCs) parallels and complements staff research at the Center for Economic Studies (CES). The RDC research program contributes new insights on a wider range of topics because a growing number of approved research projects request household microdata. Research topics at RDCs include:

- Corporate Finance and Capital
- Crime Victimization
- Entrepreneurship and Self-employment
- Health Insurance
- Housing
- Individual Choice
- Industry Structure
- Information Technology and Productivity
- International trade
- Labor market dynamics
- Migration and Immigration
- Pollution Abatement
- Poverty, Welfare, and Employment
- Productivity Dynamics
- Regional Economics
- Residential Segregation
- Services Sectors

The RDC program yields returns from using Census Bureau micro data that benefit the Census Bureau, the U.S. and international statistical systems, and public and private decision makers. RDC researchers are invited to present their work at major conferences around the world, and publish in major journals in their disciplines. Work by RDC researchers has been published in such journals as the *American Economic Review*, the *American Sociological Review*, *Criminology*, *Demography*, *Health Services Research*, the *Journal of Finance*, the *Journal of Labor Economics*, the *Journal of Political Economy*, the *Journal of Public Economics*, the *Journal of Urban Economics*, the *Review of Economics and Statistics*, and *Rural Sociology*.

Recognizing the growing importance of research in the RDC system, the National Science Foundation sponsored a one-day conference in January 2003. RDC researchers presented summaries of new findings on migration and immigration, environmental research, firm productivity and

international trade, and crime rates. The conference noted that an important benefit of research in the RDC system was the connection between microeconomics and macroeconomics, shown in the work by John Haltiwanger and others on the plant-level structure of investment and job flows. The lumpiness of investment over time and its heterogeneity across plants, documented in this sort of RDC research, has been recognized within the broader field of economics, and forms a key element in current macroeconomics models. An outcome of the conference was the proposal that RDCs serve as catalysts to form teams of researchers that, if successful, may encourage the formation of more research teams. Such teams would be consistent with the kinds of interdisciplinary approaches that some funding agencies are explicitly encouraging.

This section of the report describes the RDCs and how they operate, then presents brief summaries of most projects currently active in the RDCs, and illustrative examples from completed projects. The summaries are based on the abstracts that researchers submitted when the project was proposed. The summaries contain many references to professional literatures; full citations for those references are not included in this report. Researchers are identified by the affiliation they had when the proposal was submitted.

The topics illustrate how research in the RDCs parallels and complements research at CES. Because the RDC program is relatively new and there are long lags in social science publishing, the share of research in the RDC system that is published is currently smaller, and the share of working papers is higher, than at CES. A partial listing of publications and presentations from the RDC research program is presented in Appendix 2. A number of RDC projects are conducted jointly with CES research staff. These projects are also described in Chapter 2, Research at CES, and listed in all the appropriate Appendixes.

Research Data Centers

RDCs are secure Census Bureau facilities staffed by a Census Bureau employee. The U.S. Census Bureau operates the RDCs in partnership with prominent research universities and non-profit research organizations. 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, is feasible with the available data, is consistent with Census Bureau policies, and does not pose risk of disclosure of confidential information. To minimize the risk of disclosure, the Census Bureau strongly prefers research projects where the output will be statistical models, versus those that propose tabular outputs. Proposed projects that would use data sponsored by another agency are also reviewed by that agency.

As it does at its headquarters and other facilities, the Census Bureau takes multiple measures to protect the confidential data used by researchers in the RDC network. All access to data by researchers at Census Bureau RDCs is conducted under the auspices of approved research projects that benefit Census Bureau programs. When a research proposal is approved, researchers are granted access only to the data specifically requested in the proposal for that research project. All researchers must undergo a background check that includes the submission of the researcher's fingerprints to the FBI. All researchers must undergo mandatory training in computer security and in the handling of confidential data. All researchers must take the same oath of confidentiality that Census Bureau employees take; there are severe Federal penalties for the violation of this oath.

Although researchers may access data at the RDC, the data stay at the Census Bureau and are physically located on computer servers at the Census Bureau's Computer Center in Bowie, MD. Every RDC is staffed by a Census Bureau employee (the RDC Administrator). This Census Bureau employee is responsible for the day-to-day operation of the facility and ensures all security and access policies are followed by all users. Laptop computers and other personal computer devices are not

allowed in the RDCs. Before a researcher may remove any material from the RDC, the materials must be submitted to the RDC Administrator for disclosure review to assure the confidentiality of individual responses.

Corporate Finance and Capital

Capital Reallocation

Andrea L. Eisfeldt, Northwestern University, Department of Finance
Adriano A. Rampini, Northwestern University

This project will study capital reallocation and the liquidity of real assets. Using COMPUSTAT data, we have shown that the amount of capital reallocation is procyclical. In contrast the benefits to capital reallocation appear countercyclical. We find that a counter cyclical process for capital illiquidity can reconcile these series and discuss possible sources of this illiquidity. Our project will build on and extend our previous work. We propose to study the cyclical properties of capital reallocation and capital illiquidity, understand the nature of capital illiquidity, understand the role of used capital markets in firm dynamics, and construct stylized facts describing firm heterogeneity including the cyclical properties of dispersion in productivity, capacity utilization and investment opportunities across firms.

This research project on measuring capital reallocation has as its predominant purpose (i) to further the understanding and improve the quality of the data, (ii) to improve the methodology for measurement, and (iii) to prepare estimates of characteristics of the population. By measuring capital at the establishment or firm level and the reallocation of capital (i.e., sale or purchases of capital) across establishments or firms and by comparing the findings from the non-public data to our findings using COMPUSTAT data, the project will further the understanding of the quality of the data and improve the quality of the data. In addition, by documenting what can be learned from the existing data from the ASM/CM and ACES about the reallocation of capital, the project should lead to new or improved methodology to collect data to measure capital and its redeployment in different use. The benefits should compare to the productive interaction between the measurement of labor reallocation by Davis, Haltiwanger and coauthors and the data collection by the Bureau of the Census. The project will result in estimates of population and characteristics of population such as an aggregate capital reallocation series and documentation of its cyclical properties. Furthermore, the project will prepare estimates of dispersion measures of productivity across firms as well as the dynamics of heterogeneity across firms, an important feature of the microdata which has not been sufficiently studied.

A Study of the Annual Capital Expenditures Survey Data

Daniel J. Wilson, Federal Reserve Bank of San Francisco

The 1998 Annual Capital Expenditure Survey (ACES) is the first micro-level data set to contain information of investment spending broken down into the actual types of capital goods in which firms invest. Part of this project, therefore, will simply be to document the investment behavior of firms in terms of their allocation of capital expenditures across types. In particular, how similar are firms' investment distributions in total, within-industry, and between-industry.

Such an analysis will help researchers determine how representative industry-level capital flows data are of firm-level behavior. I also propose to compare industry-level estimates of the investment distribution from the BEA to those implied by the ACES survey data. Both the documentation of investment patterns and the comparison of the implied industry-level investment distributions to those estimated by the BEA will help determine the value of collecting this detailed investment by type data in ACES and therefore will benefit the Census Bureau.

The main purpose of this project, however, will be to measure the individual productivity contributions of various types of capital goods. A large body of empirical research has recently emerged that has found that IT investment, in particular, has a positive contribution to TFP above and beyond the contribution of total capital. The natural question, then, is: are there other capital types that also have “excess” productivity contributions? Matching ACES data to public financial data from Compustat, we can measure output, labor, materials, and total capital and thus construct a conventional measure of total factor productivity (TFP). We can then test for significant relationships between investment shares (i.e. investment in a particular capital types as a share of total investment) and TFP via regression analysis. The coefficients on the investment shares will identify the sign and the magnitude of the excess contributions of each capital type to productivity. This will be of great interest to researchers and decision-makers and therefore will help demonstrate the value of the ACES program.

Do Spin-offs and Carve-outs Discipline Firm Management? Empirical Evidence.

Debarshi K. Nandy, Boston College

We propose to study the impact of different forms of corporate restructuring on the labor market decisions, R&D activities, capital structure, and productivity of the firm and its establishments. We specifically consider spin-offs and equity carve-outs. Recently, the theoretical literature has argued that spin-offs and carve-outs have a disciplining effect on firm management. This literature has shown that restructuring increases the probability of a takeover of firms undergoing spin-offs and carve-outs by rival firms with better management ability, thus disciplining management and lowering managerial discretion. If managerial discretion decreases in this manner, we expect that the labor market decisions and R&D activities of the firm would be adversely affected following such restructuring. Establishments undergoing such restructuring will have poor productivity prior to the restructuring, with productivity improving after restructuring. This study proposes to test these hypotheses by comparing wages, employment, productivity, R&D activities, and capital structure of these establishments both before and after the restructuring to a control group of establishments that have not undergone such restructuring.

Moreover we attempt to distinguish between the effects of such corporate restructuring on production and non-production workers. Our proposed study directly benefits the Census Bureau's data by precisely identifying two types of corporate restructuring events, namely spin-offs and equity carve-outs. We propose to identify all establishments of manufacturing firms, which had a spin-off or a carve-out, by linking up the LRD and OCD with other databases, such as CRSP, Compustat, and SDC, which provide information on such restructuring events. This will help in correctly identifying the type of ownership change and thus enhance the quality of the LRD data. Our study will also help in better identifying establishments over time in a way that correctly treats the transfer of ownership and control. By linking up the SDC to the LRD, our study will help to remove possible inconsistencies related to ownership changes of establishments in the LRD data. The aim of our analysis is to provide a complete picture of the effects of corporate restructuring on the productivity of a firm, and on the employment and wages of the entire hierarchy of the firm: from executives, and central office employees, to both white and blue-collar plant level employees.

Firm Organization, Internal Capital Markets & Merger & Acquisition Activity

Gordon M. Phillips, University of Maryland/MIT Joint appointment

Our planned research centers on the question on how producers with different organizational structures react to long-term shifts in industry demand. Several recent papers have analyzed the failure rates of firms in industries, and have related the clustering of firm exits to stages in an industry's evolution ((Gort and Klepper (1982), Jovanovic (1982), Klepper and Grady (1990), Klepper (1996). Not much is known about how a producer's organizational form affects its reaction to industry shocks and how it predicts the redeployment of productive assets in the next stage of the industry's evolution. In particular, it may be that the advantage of belonging to a larger organization and having access to internal capital markets is particularly significant at times when industry-level cost or demand shifts. We

therefore focus on examining the relation between the organizational forms of firms and the long-run characteristics of the industries in which they operate, and on how these factors affect acquisition and survival probabilities of firms.

The project will examine relationships among the firm identifiers, industry classification, and accounting information in the Census Bureau's Census of Manufacturers (CM), Annual Survey of Manufacturers (ASM), and COMPUSTAT. Using the links between COMPUSTAT and the CES data recently developed by Ron Jarmin, we will be able to assess the relative importance of public and private firms in the Census Bureau's various surveys. Public firms can raise capital by issuing securities publicly to a broad class of investors and may be a larger source of growth for the economy and thus more should be known about these firms. Specific substitutive insights about the quality of the Census Bureau's economic surveys we can provide in this area include the amount of sales at the firm level are distributed between manufacturing and non-manufacturing, and how much investment takes place at the divisional level outside of manufacturing.

We will be enhancing the Census of Manufactures data with the financial data from COMPUSTAT. We will provide information from our study that will help the Census Bureau improve the sampling frame for the ASM by comparing the sample of establishments that is in the CM and ASM and the set of publicly traded firms from COMPUSTAT and by assessing the relative sampling weights of private vs. public firms on COMPUSTAT. We estimate how firm financial resources (data from COMPUSTAT) affect firm's real business decisions (data obtained from the CM and ASM), such as investment, acquisitions, and mergers. Using the links provided between COMPUSTAT & the LRD data we can thus study the interactions between financial structure and financing patterns and firms real decisions (technology adoption, investment, mergers) and thus increase information that the Census Bureau can provide without the budget cost of a new or expanded survey or census, and without increasing respondent burden. We can aid the Census Bureau by examining whether ASM establishments are being sampled at the appropriate weights given criteria of sampling both representative public and private firms. We can see what fraction of COMPUSTAT small firms are currently being sampled in the ASM and compare it to the fraction of non-COMPUSTAT firms that are being sampled.

Capital Adjustment And Productivity Patterns Of Plants And Firms In The U.S. Food And Kindred Products Industry

Pinar Celikkol, Pennsylvania State University

Productivity advancement has been a major contributing factor to economic growth in the postwar U.S. economy and more accurate measurement of productivity and growth will assist future industry and government decision-making activities. The proposed research address some fundamental issues related to productivity and growth in the food-manufacturing sector by focusing on the stimuli to productivity growth. By focusing on the investment patterns of Food and Kindred Products Industry, this project will

- Examine the behavior of capital adjustment patterns of plants and firms
- Examine the dynamic factor demand decisions and resource allocations of the constituent units of the firm
- Examine long-argued capital measurement problems surrounding the time series data
- Investigate implications of the empirical evidence for the shape of the adjustment cost function
- Analyze productivity changes of plants and firms under these capital adjustment cost and investment patterns
- Identify and distinguish the gains from investment spikes as indicative of the lifting the plateau to a new one that can lead to longer periods of productivity growth from the productivity gains within an investment period. Thus this proposal intends to take the literature one step further by investigating how capital and its adjustments influence productivity.

Generally, plant-level studies analyzing productivity dynamics concentrate on the overall manufacturing plants in U.S., while studies analyzing productivity issues in the Food and Kindred Products industry primarily concentrate on the aggregate level. There are currently no studies that analyze the productivity dynamics at the most disaggregated plant level, considering all product subgroups of the food-manufacturing sector. With this study, we will be able to focus on investment patterns and lumpy capital adjustment costs separately analyzing all sub-industries of the food sector, which allows us to capture extensive heterogeneity within and across industries. The Food and Kindred Products industry is an excellent candidate for investigating lumpy investment patterns as the industry has become increasingly capital-intensive, and high-tech over the past few decades in the processing, packaging, and marketing of food products (Morrison, 1997). Therefore, the data required for this research is the U.S. Census' Longitudinal Research Database (LRD) for the years 1963-1999 containing the annual establishment level production data for the manufacturing plants and firms specifically in Food and Kindred Products Industry. This non-publicly available Census data is crucial for understanding the productivity dynamics, the forces of productivity transition and the performance of the industry micro-and macro-level. The LRD has detailed information on products produced, employment and capital investment, labor, and material and energy at both the plant-level and firm-level, as well as information on whether firms are single-plant or multi-plant firms. Additionally variables on the size of the establishments by employment and the age of the plants can be defined. For an accurate measurement of productivity growth, we need to consider economies of scale, productivity enhancing changes arising from factors such as experience, learning-by-doing, increased knowledge, new innovations, better techniques for producing output, measuring relative capital intensity of production technology, existence of quasi-fixity of inputs, and the adjustment cost of these factors. As capital input is a significant component of total cost, analyzing the behavior of quasi-fixed factors in the measurement of productivity is crucial, especially if the firms require massive amounts of capital in the form of plant and equipment. Therefore, confidential Census data is essential to investigate the effect of capital adjustment on productivity and to develop a method, which can control for plant and firm fixed effects in measuring the productivity at plant and firm level.

This research will provide benefit to the Census Bureau by developing a new improved measure of economic growth associated with investment spikes. This methodology removes procyclical biases associated with the business cycle. Thus it has the potential to propose changes in the questionnaire design and collection methodology to improve the economic content of the information gathered by the Annual Survey of Manufacturers (ASM) and the Census of Manufacturers (CM) in the area of capital input series and total factor productivity at both the plant and firm level. By computing productivity at both levels, the researcher will be able to separately estimate both plant level productivity and firm level productivity in relation to aggregate level productivity. Previous studies have shown that aggregate growth measures may be significantly reduced when using the plant level data. Therefore the disaggregated measure of total factor productivity generated by this research will assist the Census Bureau in determining and evaluating whether the aggregation problem found in the literature is due to underlying economic forces or if it is possibly due to the questionnaire design or collection methodology.

Corporate Finance, Governance and Firm Performance

Sendhil Mullainathan, Massachusetts Institute of Technology

Raghuram Rajan, University of Chicago

Antoinette Schoar, Massachusetts Institute of Technology

Luigi Zingales, University of Chicago

The purpose of this proposal is threefold. First, we intend to extend prior work matching COMPUSTAT data to the Longitudinal Research Database (LRD) to perform a data cross check and comparative analysis for consistency. This work builds off a currently active project by Antoinette Schoar and Sendhil Mullainathan that will perform the basic matching work and will write a technical memorandum summarizing findings. This proposal will use that work in an extension to identify potential sources and explanations for the cases where data do not coincide. These discrepancies will

be systematically categorized. Second, we will investigate the relationship between corporate governance and plant performance. Twenty years ago the term “corporate governance” did not exist in the English language. In the last two decades, however, corporate governance issues have gained a prominent role in the academic literature. In spite of the importance of the topic and the magnitude of the interests at stake, there is very little empirical evidence on what the effects of corporate governance are and what constitutes “good” and “bad” governance. For this purpose we will build on the LRD-COMPUSTAT match and use ownership concentration and governance variables from to investigate the relationship between firm performance and governance.

Crime Victimization

Community Variation in Victim Crime Reporting: A Multilevel Analysis Using Data from the Area-Identified NCVS

Eric P. Baumer, University of Missouri-St. Louis, Department of Criminology

Although it has been well documented that a substantial portion of all crime experienced by citizens in the U.S. is not reported to the police, very few studies have systematically examined whether residents of certain types of communities are more, or less, likely to report crime victimizations to the police. This issue has not been addressed extensively largely because the data needed to do so—data on victims of crime and on the communities in which they reside—traditionally have not been available to researchers. If approved by the Census Bureau, the proposed research will use data from the 1995-2001 Area-Identified National Crime Victimization Survey (NCVS), linked with data from the Sample Survey of Law Enforcement Agencies (SSLEA), the Uniform Crime Reporting (UCR) program, and census data on tracts and places to investigate the effects of several characteristics of communities on the likelihood of police notification by crime victims. The community characteristics considered will include neighborhood features such as socioeconomic disadvantage, minority concentration, immigrant concentration, and residential instability, and place-level indicators such as the degree of local police involvement in community policing activities and the racial composition of the local police agency. The proposed research contributes significantly to the literature on victim crime reporting, and the analyses have important implications for macro-level research and theory tests which often assume little or no systematic variation in crime reporting across communities. In addition, the research will benefit the Census Bureau by adding contextual data to the NCVS, evaluating and improving the usefulness of the NCVS, using methodologies (e.g., survey regression techniques, multilevel modeling) that will enhance understanding of these data, and highlighting the value of the NCVS for cutting-edge theoretical and relevant research.

Individual, Situational and Contextual Influences on Official Agency Contacts by Assault Victims: Implications for Estimating Levels of Assaultive Violence

Jacqueline Cohen, Carnegie Mellon University
Laura Dugan, University of Maryland

Our knowledge of the prevalence and nature of non-lethal violence is highly dependent on data collected by agencies that serve victims. While such data sources contribute to our understanding of violence, the victim contacts that are detected by these systems understate and possibly misrepresent total prevalence and incidence rates. The proposed research pursues two main objectives. First, we will use National Crime Victimization Survey (NCVS) data to estimate the probabilities that a victim will contact the police, seek medical care, or both, conditional on individual and situational factors. Second, we will explore whether distinctive contextual features of local areas contribute to further variation in the likelihood that victims seek services. To achieve the first objective, the proposed research will rely on public-use NCVS data of assault incidents to explore the influence of various incident features on the probability of agency contacts with police, healthcare providers, or both systems. To achieve the second objective, we will estimate contextual effects by linking area-identified

NCVS data with criminal justice policy and healthcare data for 48 of the largest 50 US cities. The analysis will seek to identify system features that are associated with an increased likelihood of victim/agency contacts.

The Impact of Violence on Neighborhood Business Activity

Robert T. Greenbaum, Ohio State University

The proposed research will investigate the impact of violence on non-victims. We will combine geo-coded homicide data from six cities over ten years with a longitudinal data set containing all business establishments in these cities to determine whether localized surges in homicide activity have an impact on neighborhood business districts. If, after controlling for prior trends in business activity, homicide surges are followed by closings of retail and personal services business establishments, this will provide empirical evidence that non-victims, such as customers and employees, are changing their behavior and thereby incurring a cost from increases in violence.

The proposed research will provide a number of significant benefits to the Census Bureau. Because the Longitudinal Business Database (LBD) is a new data set, the project will provide the Bureau with an early assessment of the quality of the data. The study utilizes temporal and spatial aspects of the data, thus allowing for tests of the stability of the data across both dimensions. For the six cities, the research will hopes to provide important improvements to the geocoding of the existing LBD data by creating a stable set of ZIP groups, which will be created by accounting for the changes the U.S. Postal Service makes in ZIP codes over time. A bridge file linking old ZIP boundaries to new ones in order to create a stable list of ZIPs will be given to CES to aid to future researchers. Finally, the proposed research will provide new insights into the relationship between neighborhood job growth and violence that will assist federal, state and local decision makers in designing practices and allocating resources to improve the quality of life in urban areas. By helping to provide additional information about the interactions between residents and the characteristics of the local business community, we will help provide richer measures of the census variables.

Entrepreneurship and Self-employment

The Survival And Operation Of Entrepreneurial Ventures

Austan Goolsbee, University of Chicago

The purpose of this proposal is to improve the accuracy and quality of the ongoing Survey of Business Owners by helping distinguish true entrepreneurial ventures from individuals with small amounts of supplemental income and by addressing some of the difficulties arising from follow-up surveys of small firms that have gone out of business. It will do this by studying the economic determinants of the survival and operation of legitimate entrepreneurial ventures. The project will use information from the 1992 Characteristics of Business Owners (CBO) survey on the health and operation of businesses in 1992 and 1994 further matched to the establishment lists (SSEL) and, where possible, the Longitudinal Business Database (LBD) and the future release of the Survey of Business Owners (SBO) to examine the survival and operation of entrepreneurs.

It will look at two basic areas. The first is determining what economic factors influence the probability of survival for entrepreneurial firms. This will focus particularly on local credit conditions and local economic growth as well as on the influence of direct government support to entrepreneurs at the state and local level. The determinants of small firm survival are directly tied to the difficulties of follow-up activity required by the Census Bureau. The second is examining the impact of taxes (and some regulations) on the operation and offerings of the entrepreneurial firms. This will focus specifically on

the subjects of how marginal income tax rates affect the hours that entrepreneurs choose to work on their businesses, how much income they report and the likelihood of hiring employees, as well as the role that they play on the likelihood that small businesses offer health insurance, pension plans, or medical leave to their workers, and to the probability that they operate the business out of the owner's home. Each of these subjects is correlated with a business being a true entrepreneurial venture (people with small amounts of supplemental income are unlikely to work long hours on the job, hire employees, offer health, pension or family leave, or move their businesses out of the home).

The CBO, with its detailed micro level observations and ability to follow individuals across time even beyond the time frame of the survey by matching to the SSEL and the LBD, gives a unique opportunity to answer such questions. While the CBO is a sample of people with Schedule C income (as well as some partnerships), it avoids the typical problems of using tax return data by providing extensive information about the characteristics of the business owner, their background, and the like. This makes it the ideal basis for such a project.

Economic Strategies of Survival and Mobility: Ethnic Entrepreneurship in the United States.

Zulema Valdez, University of Michigan

What is the effect of ethnicity on entrepreneurial activity? The neo-classical perspective suggests that human capital, defined as education and work experience, explains entrepreneurial outcomes regardless of ethnicity. The ethnic entrepreneurship approach argues that ethnicity provides social capital, such as reciprocal obligations, which facilitates enterprise. Drawing on economic sociology, this study combines the human capital and ethnic entrepreneurship approaches by introducing a framework derived from Polanyi (1944). Following Polanyi, this research argues that societies are constituted by three forms of market integration: market-exchange, reciprocity, and redistribution. Under capitalism, the market-exchange relationship is the dominant form of economic integration. Secondary relationships of reciprocity and redistribution, however, exist alongside the primary exchange relationship and provide compensatory support in the face of market uncertainty or disadvantage. Using the *1990 and 2000 US Census* and the *1992 Characteristics of Business Owners*, this study proposes to examine the effects of primary and secondary relationships of market integration on entrepreneurial participation and economic success. This research provides evidence that reciprocal relationships, which generate social capital, contribute to an explanation of entrepreneurial participation. Yet, findings reveal that market-exchange relationships, constituted in part by human capital or class background, better explain entrepreneurial economic success, regardless of ethnicity.

The analysis of the 1990 and 2000 Census and the 1992 Characteristics of Business Owners Survey will benefit the US Census Bureau in two ways. First, this proposed analysis will construct, verify, and improve the sampling frame for future Census and CBO (SBO) data collection. Second, this proposed analysis would provide estimates of a variety of understudied ethnic and racial group populations and characteristics of these populations as authorized under Title 13, Chapter 5.

Health Insurance

The Health Care Safety Net and Employer Health Insurance Provision

Anthony T. Lo Sasso, Northwestern University

Little is known about the role of the local health care safety net in affecting employers' decisions to offer health insurance to their workers and the characteristics of the health insurance offered. The availability of safety net health care services may induce some firms not to offer health insurance to workers. Examples of firms that might be most likely to consider public sources of health

care a potential substitute for privately-offered insurance include small firms with potentially high health insurance costs, firms hiring predominantly low-wage, low-skill workers, or firms in economically depressed areas. We propose to use Medical Expenditure Panel Survey Insurance Component (MEPS-IC) data for the years 1996-2000 combined with detailed measures of local health care facilities to examine the link between local safety net characteristics and employer-provided health insurance. By surveying approximately 25,000 firms annually regarding the characteristics of their health insurance, the MEPS-IC provides an ideal means of examining how local health care safety net characteristics affect the willingness of firms to offer health insurance. The detailed measures, the consistency of measurement over time, and the sample size will allow us to explore not only how the health care safety net affects whether employers offer health insurance but also the effects on the attributes of offered health insurance.

We have identified three primary benefits to Census Bureau from our research. First, related to understanding the quality of the data, our research will involve different means of measuring the extent and characteristics of health insurance provision by employers for different subgroups of employers. Second, related to potential improvements in the quality of the data, our project involves a new approach to measuring the substitution of privately provided health care for publicly provided health care. Third, our project will enhance the MEPS-IC data by adding information from other data sources on local safety-net measures.

Reaching the Uninsured Through the Individual Insurance Market M. Susan Marquis, RAND

Our study, which is funded by the California HealthCare Foundation, will investigate the role the individual health insurance market in California plays in covering the population. It will examine the objective factors, motivations, and attitudes that influence consumers' decisions to participate in the individual market; how changes in price, benefits design, and public policies would affect that role and the number of uninsured; how purchasers of coverage decide among the plans available to them; and patterns of entry and exit from the individual market for health insurance.

We propose to use pooled cross-section and time-series data from two Census surveys—the March Current Population Survey (years 1996 through 2001) and the 1996 SIPP panel—to study decisions to purchase insurance by the potential market in California.

The specific questions we will answer using the CPS and SIPP include:

- What share of the potential market purchases individual coverage in California? How does this vary among important population subgroups?
- What factors influence the decision to purchase individual insurance? Specifically, what is the role of variables that might be affected by factors such as price, nature and number of products available?
- Does the availability of safety net providers affect decisions, especially of the near poor? Is there health selection in participation?
- Does greater diversity in the nature of products available increase market segmentation and alter the health risks participating in the market?
- What affects intra-family decisions about coverage for individual family members?

The study would benefit the Census Bureau in several ways. First, we will increase the utility of the Census data by using it to address important health care issues that we expect will help inform the decision making progress. In addition, to providing estimates of important behavioral relationships in the population, the analysis will yield important descriptive information about those who purchase in the individual insurance market. Second, we will be estimating models using multiple household surveys. Similarities or differences in modeling results will yield information about the reliability and validity of measures from the various surveys. In addition, we have administrative data from insurers in California that we can use to help assess the validity of survey measures. (For example, we can compare

average duration of coverage measured in the SIPP panel with duration from administrative records. Any restricted administrative data from participating insurers will be analyzed outside of the Census data center.) Finally, our project statistician is developing ways of combining nonlinear regressions analyses from multiple household surveys that could be used by other researchers.

Evaluating and Enhancing the MEPS-IC as a Source of Employment-Related Estimates

Philip F. Cooper, Agency for Healthcare Research and Quality
Jessica P. Vistnes, Agency for Healthcare Research and Quality
Kosali I. Simon, Cornell University

The Medical Expenditure Panel Survey (MEPS) - Insurance Component (IC) conducted by the United States Census Bureau is a key economic survey that provides important information on employer sponsored health insurance for the nation. Published results from this survey are used by the Bureau of Economic Analyses as a key input to health care costs in Gross Domestic Product. Results are also used by numerous other government agencies, including, the General Accounting Office and Treasury to support Congressional requests and assess the status and costs of employer health insurance. States also use the data as key input into their economic analyses.

As a key user and sponsor of this survey, the Agency for Healthcare Quality and Research (AHRQ) wishes to increase the quality and utility of this Census data. Because of the principal investigators' unique knowledge of employer-sponsored health insurance and their econometric and statistical expertise, they have already contributed extensively to the technical aspects of the survey and to improvements in the quality of the IC data and its uses. This project should contribute to this effort to improve the survey.

Among the goals of this research are the following:

- Produce estimates related to the supply and demand of employer-sponsored health insurance.
- Develop new and improved methodologies for producing such population estimates.
- Develop an understanding of the quality of data collected, through analysis of response rates, item response rates and data collection results, in order to produce changes in questionnaire structure and collection methodology that will improve collected data.
- Identify shortcomings of the questionnaire to obtain the information necessary to produce reliable population estimates related to employer-sponsored health insurance.

As can be seen, the purpose of this proposal is to allow AHRQ to use its technical and subject matter expertise to enhance Census Bureau products.

Financial Protection Provided by Employer-Based Health Insurance

Roland D. McDevitt, Watson Wyatt Worldwide
Jon R. Gabel, Health Research and Educational Trust

Although large and small firms generally pay similar premiums for health insurance, it is widely believed that these premiums purchase less generous plans for small firms. This lower "actuarial value," along with the lower wages paid by many small firms, may help to explain why many of them do not offer coverage and why many workers in these firms decline it when offered. The actuarial value of a plan is the percentage of medical expense that it will pay for a covered population. It allows us to compare the adequacy of coverage across plans and make value-adjusted comparisons of premiums.

While an extensive literature monitors the prevalence of employer-sponsored health insurance across states and firm sizes, surprisingly little has been published about the actuarial value of this insurance and how it varies across states, firm sizes and plan types. This project will examine variations in the actuarial value and value-adjusted price of employer-sponsored health care benefits. It will also examine the financial protection that group insurance affords persons with differing levels of

health care use. Finally, it will improve our understanding of why some employees decline to take-up coverage and why some employers don't offer coverage, by adding the actuarial value of the health care benefit to the list of explanatory factors.

The major study database is the Census Bureau's 2000 Medical Expenditure Panel Survey Insurance Survey (MEPS-IC). AHRQ's MEPS Household Survey will also be used together with Watson Wyatt software to simulate the payment of medical claims for a standard employer-sponsored population. Based on these simulations, an actuarial value will be calculated for each of the MEPS-IC health plans. Watson Wyatt, a leading actuarial and benefits consulting firm, will collaborate with the Health Research and Educational Trust (HRET) on this study. The study will produce statistical models and at least one journal article that explore these dynamics of job-based health insurance. This project will greatly enhance the MEPS-IC data by adding the actuarial value for each health plan. This proposal has been approved for a \$180,000 grant from the Commonwealth Fund.

In addition to evaluating and documenting inconsistencies or other deficiencies in the MEPS-IC health plan data, we will recommend recodes or imputations to address them. These recodes and imputations can be added to the MEPS-IC data for use by future researchers at the RDC. Watson Wyatt will estimate the actuarial value of each health plan in the MEPS-IC database. The result will be a "benefit rate" that represents the percentage of charges each plan would pay if that plan were offered to a standard population. We will also estimate the plan medical expense and beneficiary out-of-pocket expense for the top ten percent of users, the top 25 percent of users, the top 50 percent of users and the bottom 50 percent of users. These new variables will be required for the proposed project and they will be added to the MEPS-IC file for use by future researchers at the RDC. In the process of calculating the actuarial value for each plan, we will also evaluate and document any internal inconsistencies or other deficiencies in the MEPS-IC plan data. Simulating the actuarial value of a plan is an excellent way to evaluate these data quality issues, because it requires comprehensive examination of plan provisions and the manner in which they interact. The addition of actuarial value to the MEPS-IC file will allow the calculation the mean actuarial value for the population of health plans offered by private sector firms. It will also allow us to profile the distribution of actuarial value of health plans at various points in the distribution. We will calculate these at the 90th percentile, the 75th percentile, the 50th percentile, the 25th percentile and the 10th percentile of actuarial value. We are also prepared to estimate other health plan population characteristics, including premiums, employer contributions, and health plan cost-sharing provisions.

Housing

**Individuals and Neighborhoods:
A Reciprocal Relationship and its Consequences for Change over Time**

John R. Hipp, University of North Carolina, Chapel Hill
Kenneth A. Bollen, University of North Carolina, Chapel Hill

This study will look at how neighborhoods change over time, how this change affects residents' perceptions and actions, and how residents' actions impact on the neighborhood change. Using longitudinal data, it will test two competing theories explaining the relationship between residential instability and crime rates in neighborhoods. I will also test whether the social capital in an area (embodied in social networks, voluntary organizations, and various other institutions) can ameliorate negative impacts on the neighborhood and prevent the downward spiral experienced by some neighborhoods. But to understand how neighborhoods change it is necessary to have an accurate measure of neighborhood quality.

A key component of this study will be determining the usefulness of the subjective measures regarding neighborhood satisfaction, characteristics, and crime provided by respondents to the

American Housing Survey (AHS) survey. I will combine a rich data set of measures culled from official sources with the AHS subjective responses in 21 metro areas as well as the three national neighbors subsamples (from 1985, 89, and 93). I am collecting a unique longitudinal data set of crime rates for small areas within particular cities. These data will allow me to assess the reliability of respondents to the questions about perceived crime. This will provide valuable information for future researchers who wish to use the subjective responses to the AHS for inferring the objective crime rates in neighborhoods. In addition, by linking in the official data I have collected with the AHS, I will be able to determine the sources of neighborhood satisfaction. This will provide insight if there are important neighborhood dimensions of neighborhood satisfaction that the AHS is not currently asking respondents, and provide guidance for future modification of the survey instrument.

A General Equilibrium Analysis of Urban Labor and Housing Markets

Stephen L. Ross, University of Connecticut

In this project, we propose to estimate an empirical model that describes the equilibrium location and employment decisions made by households and firms within a single metropolitan area. In our model, each household makes its residential location decision based on a wide variety of factors including characteristics of housing and schools, neighborhood sociodemographic characteristics, housing prices, other neighborhood amenities, and employment access. The employment of each household member is in turn influenced by his/her access to suitable jobs, neighborhood characteristics, and individual/household characteristics. Firms make decisions based on access to different types of workers, other firms, and customers, and in our most general specification a firm's location directly influences the characteristics of its workforce. These decisions combine to create a complex spatial equilibrium, which determines land use, prices, and wages throughout the metropolitan area.

We use the estimates of this model to explore complex interactions in urban labor and housing markets, focusing on two well-known questions in which the simultaneity of the household residential location and employment decisions as well as the simultaneity of household and firm location decisions have been quite evident. These questions relate to whether access to employment influences labor market outcomes, and whether the quality of a neighborhood affects labor market outcomes. We begin this proposal by describing these important research questions and the difficulties researchers have had controlling for the endogeneity problems introduced by the simultaneity of these decisions. We then describe our methodology and explain how the estimates of our model can be used to shed new light on these questions.

Individual Choice

A Proposal to Examine Residential Location and Schooling Decisions by Households in California Using 1990 Decennial Census Long Form Data

Patrick Bayer, Yale University

Robert McMillan, University of Toronto and Public Policy Institute of California

Kim Rueben, Public Policy Institute of California

Our proposed project uses the 1990 Decennial Census Long Form Data for California to investigate the residential location and schooling (public vs. private) decisions of household with children. Combining the Census data with information about local schooling and community characteristics, we estimate a discrete-choice model in which each household simultaneously chooses a residence and a school for its children. The resulting parameter estimates enable us to distinguish: (1) how households make trade-offs between public safety, housing, commuting costs, schooling and other location-specific goods when choosing a residence; (2) how households make trade-offs between public and private school characteristics (including achievement scores, peer characteristics, and class

size) when choosing between private and public school; and (3) how these trade-offs vary with a household's own characteristics including its income, education, family structure, and race.

We then use the parameter estimates from the discrete-choice model to investigate the underlying basis for the observed differences in the consumption of school quality across households with different characteristics. In particular, we wish to explain the empirical observation that minority and poorly educated households (controlling for income) live in relatively poor quality school districts. Are these differences driven by differences in preferences for schooling itself? Or are they instead explained by variation in other factors that affect the location and schooling decision, such as differences in preferences over the race of one's neighbors or the quality of housing? The answers to these fundamental questions are especially important for predicting the impact of policy reforms such as the adoption of school vouchers, both in terms of schooling outcomes and household stratification across communities and between public and private schools.

Our research should bring two key benefits to the Census Data programs. First, we will compile a well-documented series of datasets that can be matched to the Decennial Census Long Form Data by later users. These data will contain a wealth of information concerning each household's school district and its location more generally. The school district data, which include achievement scores, teachers' characteristics and salaries, and many other school inputs, will be organized such that a record will exist for each block (or block group or tract), and this in turn can be easily matched to household records. Other datasets will provide community-level data on air, quality, climate, crime rates, topology, urban density, and other location-specific information; as with the school district dataset, each of these datasets will be organized so that a record exists for each block. As a second benefit to the Census, making use of these richer data, we will provide an algorithm that calculates distance-to-work measures for each working individual in the Census, a useful complement to the self-reported time-to-work measures specified in the Census data. We will also provide a partial test of the accuracy of these self-reported time-to-work measures directly, by computing average commute times across all household that commute to and from the same pair of census blocks (or block groups). We can then gauge the extent to which individual with the same commute report similar commuting times, controlling for departure time and mode of travel.

An Economic Analysis Of Availability, Choice And Valuation Of School Quality Using The 1990 Decennial Census Long Form Data

Fernando Vendramel Ferreira, Wharton School, University of Pennsylvania

The proposed project uses the 1990 Decennial Census Long Form Data for California to investigate the consequences of barriers to sorting, such as availability of houses and transaction costs, in the housing market equilibrium and its effects on the valuation of school quality. It builds on research by Bayer, McMillan, and Rueben. The methodology is based on the estimation of random coefficients multinomial logits, where I examine how different choice sets affect household sorting, after accounting for transaction costs, and modeling household mobility explicitly (mobility as a probability of moving to a different house unit). The inclusion of this extra modeling will permit the estimation of unbiased probabilities of households choosing a certain house/neighborhood. Also, the new models make it possible to identify the characteristics of individuals most affected by barriers to sorting. Only with such information can one understand how individual preferences determine location decisions and how important school quality is in determining housing choices within a heterogeneous population. Hypothesis testing will be performed on the average marginal willingness to pay for school quality estimates, as well as on the heterogeneity in individual preferences estimates. The research is feasible given the richness of the Decennial Census Long Form Data. These data provide the geographic location of each household's place of residence at the Census block level, allowing the choice sets to be defined precisely in terms of house attributes/neighborhood characteristics. Also, with the Decennial Census Long Form Data, I can accurately assign a public school to each house unit, providing a school quality measure that will be extensively used in the estimations. This research yields benefits to the Census Bureau that fall into four areas: (1) compiling a series of external datasets to be linked to the 2000 Decennial Census Long Form Data; (2) analyzing measurement errors in the self-reported 'travel

time to work' variable; (3) providing comparisons between allocation methods for the 'travel time to work' variable; (4) providing an algorithm for linking Census data with data from other sources, with an application to public school data. I will also attempt to create weights for school attendance areas and estimates relating school-age children and households with children in school.

The Effects of Cigarette Price and Tax Increases on Decisions to Quit Smoking and Four Decades of Smoking Cessation

Donald Kenkel, Cornell University
Dean Lillard, Cornell University
Alan Mathios, Cornell University

This abstract describes two projects for which we request that geocode data be attached to data from the National Longitudinal Surveys-Original Cohorts. For our projects, we need to identify each respondent's state of residence in each year of the survey. The first project examines the effects of cigarette price and tax increases on decisions to quit smoking. This project is currently funded by the Robert Wood Johnson Foundation (RWJF). The second project would examine four decades of smoking cessation. We are about to submit this project for funding. Smoking is the leading preventable cause of death in the U.S., contributing to more than 400,000 deaths annually. A recent public health initiative, *Healthy People 2010*, aims to cut the prevalence of smoking among adults in half, from the current rate of about 24 percent to 12 percent. While recent policy debates have tended to focus on how to prevent youth from starting to smoke, a recent analysis concludes that the *Healthy People 2010* objective cannot be met without large increases in smoking cessation rates (Mendez and Warner, 2000).

Our broad objective is to extend economics research on smoking to investigate the determinants of cessation decisions. The proposed project will provide econometric estimates of the effects of public policies on smoking cessation. The econometric analysis will use five large nationally representative panel data sets: three of the four samples of the National Longitudinal Surveys Original Cohort – Older Men, Mature Women, and Younger Women; the National Longitudinal Survey of Youth - 1979; and the Panel Study of Income Dynamics. Retrospective questions on smoking in these surveys allow us to construct measures of each respondent's lifetime smoking history. Using the smoking histories, we will examine the determinants of smoking cessation from the 1960s to the 1990s. Using information on geographic location, the project will merge policy variables with the core data to provide histories of the policy environments faced by respondents. The merged data will allow us to study how quit rates are influenced by taxes, direct restrictions on smoking, information about the health consequences of smoking, and the availability of smoking cessation products. The longitudinal nature of the data will also allow us to explore the impact of life course events such as fertility and marital breakup, as well as the impact of socioeconomic factors that vary across the life course, such as work status and income.

Industry Structure

Vertical Integration

Ali Hortacsu, University of Chicago
Chad Syverson, University of Chicago

The proposed project seeks to exploit firm identifiers in establishment lists (the Standard Statistical Establishment Lists [SSELS] and the Census of Manufactures [CM], and possibly the Longitudinal Business Database [LBD]) to obtain measures of vertical integration within the manufacturing sector, and then apply these measures to empirical testing. We wish to measure the extent to which vertically integrated firms comprise industries and, in some cases, markets within

industries. We will identify manufacturing establishments in vertically integrated firms by identifying plants whose owning firm also owns establishments in vertically linked industries. A comprehensive vertical integration measure would account for establishments in non-manufacturing sectors (e.g., when a manufacturer owns its retail outlets). If data limitations preclude this, it is still possible to obtain (more limited) “within-manufacturing” measures of vertical integration using only Longitudinal Research Database / CM data. We will conduct both industry-level and plant-level empirical analyses with these vertical integration measures.

The proposed project will expectedly produce a number of benefits to the Census Bureau. We will construct and document an industry-level panel data set of vertical integration measures that can be used for a number of purposes. These include, but are not limited to, economic research into the interactions between integration and/or vertical mergers on input and output markets, comparison to more simply derived industry vertical integration measures (such as the ratio of value added to total output) to gauge the more simple measures’ accuracy, and analysis of legal policies that affect or are affected by the extent of vertical integration. These indices are novel and would be computed at an aggregate (industry) level; as such, they may be able to be made available to other researchers. Additionally, by investigating specifically the quality of the firm identifiers in the SSEs (which are of course of crucial interest to the success of this project), we will augment the considerable establishment-linking efforts that have been made to create the Longitudinal Business Database. Given the availability of establishment lists outside of the manufacturing sector, we will also be able to characterize the extent to which intersectoral ownership has changed over time. This may be of particular interest to the Census Bureau as its economic programs shift focus to non-manufacturing sectors. Finally, we will be able to provide estimates of a number of elasticities in the population. These include the responsiveness of vertical integration to technology and market structure (at both the industry and establishment levels), and the correlations between changes in vertical integration status and productivity. These estimates can be made exploiting both between-establishment differences and intertemporal variations within establishments.

Productivity Heterogeneity and Market Segmentation

Chad Syverson, University of Chicago

The proposed project is a follow-on to an earlier CES project and consists of two extensions. The first regards the link between market segmentation and price dispersion. This research seeks to utilize the establishment-level Products and Materials Files from the Census of Manufactures (CM) to see if the connection between output substitutability and between-plant productivity differences documented in the earlier project also manifests itself in pricing decisions. The project will characterize if and by how much prices systematically vary across markets within an industry, which could have important sampling frame implications. Furthermore, because of its extensive use of the CM Products and Materials Files, the research is intended to improve the quality and usefulness of this highly detailed but underemployed data. These data suffer from the large amount of imputations within them, which are not always separately identified as such. The project will, for the industries it studies, facilitate comparisons between establishments with and without imputed data to check if and how those plants are systematically different, offering guidance regarding the reliability of the numbers.

The second proposed extension applies to the estimation of establishment-level productivity levels. An important product of the earlier project was a data set of local demand-shifting instruments that could be used for, among other things, productivity estimation. Many interesting issues remain with respect to identification of technology parameters with microdata, such as differing rates of return to inputs and input mix selection based upon these differences, plant technology choice and local input markets, and the link between productivity and input choice. The proposed project will explore such issues in a theoretical framework of selection and treatment that has been well developed in the labor literature, but largely unused in productivity research. I plan to obtain measures of the *distribution* of establishment technologies within industries. These will be linked to other industry-level observables in order to find patterns between technology choice and input and output market structures. (These industry-level technology distribution measures could possibly be made available to other researchers.)

It is also expected that this work will identify data that is not presently collected but would be useful for correctly measuring productivity and understanding its dynamics.

Competition and Industry Structure in Food Services

Clarissa A. Yeap, University of Chicago

This project will study the linkages among price competition, non-price competition and industry structure in the food services industry. Using information on revenues, prices and non-price product attributes, it will provide direct empirical evidence of how firms' prices and product choice are related to each other and to industry structure. This will shed light on how firms compete in industries with many firms and heterogeneous products, typical characteristics of the growing services sector. It will add to the knowledge of how markets work by revealing some of the feedback mechanisms between structure and conduct in such markets.

The primary dataset will be firm-level microdata for food services establishments from the Economic Census in 1972, 1977, 1982, 1987, 1992 and 1997. I will use the information on revenues, prices and product attributes from this dataset to analyze how firms compete in prices and non-price characteristics and to relate market structure to the competitiveness of industry. The analysis will consist mostly of statistical tests and estimation techniques to study the relationships between these variables. Therefore, the output will largely be regression estimates and aggregate statistics. I will work closely with Census staff to avoid inappropriate disclosure.

Other datasets to be used in this study are the Business Expenditures Survey (BES), Assets and Expenditures Survey (AES), County Business Patterns (CPB), County and City Data Books (CCDB), the Standard Statistical Establishment List (SSEL) and Longitudinal Business Database (LBD) in 1971-1997, where each is available. I will use firm-level operating expenses data from the BES, AES and CPB to control for variation in costs across firms and market-level data to control for variation in costs across markets. The CCDB will provide demographic information to account for variation in tastes across markets. The SSEL contains firm identifiers, name and address files that I will use to track affiliation among establishments. The LBD contains firm identifiers that will help to link the data across years for longitudinal analysis.

This project's main benefit to the Census will be to provide an evaluation of the quality of the microdata for the food services industry. This will enhance the Census' understanding of the dataset and provide guidance for improvements to its surveys. Specifically, this project will assess the quality of the data with regard to non-responses, characterize the extent of imputed data, and document higher moments and other statistical characteristics of the distribution of key variables. Furthermore, it will verify the internal consistency of the data and provide the Census with a cleaned and documented dataset that may be useful to other researchers. The proposed project will also enhance the Census microdata by developing links to market-level costs data in the BES and CPB, and to market-level population and household demographics in the CCDB. In addition, for a subset of establishments, it will link the Census microdata to firm-level operating expenses information in the BES. The resulting dataset will contain rich information on costs, prices, product choice and revenues for individual firms. Finally, the project may also provide links over time for these data for longitudinal analysis. Another benefit that will come from this project is the preparation of estimates of several characteristics of the food services establishment population. Estimates of the correlation among prices, product attributes, ownership structure, demand characteristics and costs will enhance the Census' understanding of how these variables are related in this industry. These estimates will be provided at the market and establishment levels.

Efficiency Implications of Corporate Diversification: Evidence from Micro Data

Ekaterina E. Emm, Department of Finance, Georgia State University

In this project, we contribute to the ongoing research on the rationales for corporate diversification. Using the Longitudinal Research Database (LRD) as our main source of data, we examine whether combining several lines of business under one corporate umbrella leads to increased productive performance. Studying the direct effect of diversification on productive efficiency allows us to discern between two major theories of corporate diversification: the agency cost hypothesis and the synergy hypothesis. Further, the project contributes to the literature by investigating whether efficiency differences between diversified and focused firms lead to the “diversification discount”. To measure productive efficiency, we employ a non-parametric approach, the Weak Axiom of Profit Maximization (WAPM), using establishment-level and firm-level data. This method has several advantages over other conventional measures of productive efficiency. To the best of our knowledge, this project is the first application of the WAPM to a sample of non-financial institutions.

This project will provide benefits to the Census Bureau's data programs through understanding and improving the quality of the data. The project will merge the Annual Survey of Manufactures (ASM/LRD), Census of Manufactures (CM/LRD), Company Auxiliary Offices (CAO), National Employer Survey (NES)-when available, Standard Statistical Establishment List (SSEL), and the time-linked version of the SSEL called the Longitudinal Business Database with the public-use databases COMPUSTAT, Center for Research in Security Prices (CRSP) and Security Data Corporation (SDC). Once the databases are merged, comparisons of the data items collected by the Census Bureau to the data contained in the public-use databases will be performed. The project will also benefit the Census Bureau's program through analyzing characteristics of population. The project will increase the Census Bureau's knowledge base regarding the rationales for corporate diversification using a new methodology, the WAPM, to estimate firm efficiency.

The Industry Life Cycle of the Size Distribution of Firms

Emin M. Dinlersoz, Department of Economics, University of Houston

This project aims to provide the Census Bureau with a new set of stylized facts and statistics pertaining to the life-cycle behavior of the size distribution of firms in U.S. manufacturing industries. This goal will be achieved by analyzing the evolution of the size distribution of firms in an industry as the industry goes through its life cycle, i.e. different stages of growth. The size distribution of firms is intimately related to important industry aggregates, including inter-firm distribution of productivity, as well as to differences among firms in terms of production technology and product mix. Despite the importance of a comprehensive understanding of changes in the size distribution of firms in an industry over time, little has been done so far to uncover the nature of such changes.

When all manufacturing firms are considered together, it is well known that the size distribution of firms, measured either by employment or value of output, is quite stable over time (see, e.g., Ijiri and Simon (1977), Sutton (1997), Axtell (2001)). However, theories of industry dynamics and finer industry level data (e.g., Gort and Klepper (1982), Klepper and Grady (1990)) suggest that this aggregate stability masks significant underlying inter-industry heterogeneity. As industries experience growth, shakeout, stability and decline phases, the size distribution of firms is predicted to exhibit significant changes.

Models of industry life-cycle (e.g., Jovanovic and MacDonald (1994)) and empirical findings regarding firm and plant dynamics (e.g. Dunne, Roberts and Samuelson (1988, 1990)) collectively suggest that the size distribution is likely to be right skewed during the early phases of an industry, because initially most firms are small. As the industry grows and more entry occurs, the size distribution is expected to shift to the left and become even more right skewed, since most entering firms are small. Correspondingly, when an industry experiences its shakeout phase, small firms are more likely to exit the industry and the importance of larger firms in the size distribution increases. Thus, we expect to observe a decline in the skewness of firm size and rightward shift in firm size distribution. These

general predictions, not to mention other, more detailed, hypotheses based on specifics of particular models of industry evolution, have not been tested before. The prevalence of these patterns across different industries, and even whether any generalizations are possible, is ultimately an empirical question. Our goals are to provide a comprehensive documentation of the evolution of the size distribution, and to establish a link between the patterns observed and theories of industry dynamics and evolution.

The empirical analysis in this project requires observations on alternative measures of firm size for all firms over several time periods and across narrowly defined industries. Unfortunately, no public dataset meets these criteria simultaneously: measures of firm size at the individual firm level are not publicly available for a comprehensive set of industries and time periods. Publicly available datasets only provide information about plant size, as opposed to firm size. Furthermore, plant size information is in the form of discrete size ranges, as opposed to individual observations. Finally, the only measure of plant size in public data is employment, which is not the ideal measure from a theoretical point of view. We therefore propose to use the Census Bureau's Longitudinal Research Database (LRD) and the Annual Survey of Manufacturers (ASM) for the analysis of firm size distribution. Since the nature of the analysis is dynamic, the data for all available years (1963, 1967, and for each year between 1972 and 2002) will be utilized, subject to availability. The size distribution of firms will be constructed for each 4-digit industry. The LRD and the ASM provide several measures of firm size, such as employment, output and sales, which will be obtained by aggregating the corresponding size measures provided for all the plants of a firm. This firm level information will be aggregated to a size distribution, and to statistics that describe the distribution of firm size, e.g., skewness, variance, and kurtosis. The evolution of these statistics will be investigated using a variety of statistical and econometric procedures.

The life-cycle analysis benefits the Census Bureau programs by providing a new set of statistics and stylized facts on the evolution of the size distribution. Several new population estimates will be obtained for firms and industries in the LRD database as a result of the statistical analysis we plan to carry out. The project will help understand and evaluate the quality and relevance of the different measures of firm size, a subject on which theory, thus far, has not been informative. This will in turn assist the Census Bureau in development of more useful questions pertaining to size of an establishment in future surveys. Simultaneously utilizing the confidential data in the LRD and the publicly available NBER/CES Manufacturing Productivity Database and the County Business Patterns (CBP) Database will provide an independent way of validating the quality of data in the NBER Productivity Database and CBP Database at the industry level.

Distribution Company Level Industrial Energy Forecasting

Gale Boyd, Argonne National Laboratory

Ron Fisher, Argonne National Laboratory

Jim Peerenboom, Argonne National Laboratory

Industrial energy demand typically involves base load consumption. As a result the industrial component of energy demand has important implications in evaluating energy infrastructure, i.e. oil, gas, electric power. There is growing concern that the energy infrastructure could be subject to both natural (e.g. storms or equipment failure) and manmade (e.g. terrorist) disruptions. To address the economic and human implications of such a disruption, planning agencies are taking a closer look at the energy infrastructure and its customers to assess its robustness and ability to continue vital functions as well as identify potential weaknesses. This project uses the LRD and MECS databases to estimate a distribution-company-level model of industrial energy demand for natural gas and electricity via a plant-level energy demand equation. An element unique to this study is the use of "establishment location" in a geographic information system (GIS) to create new, supplemental data on the relationship between the plant and the energy distribution system. These supplemental data are then used to improve the forecasting abilities of the econometric model. The benefits to the Census Bureau include 1) the creation of the GIS layers that can be used to access various data sources such as the LRD, MECS, and SSEL, in an intuitive visual mode which highlights spatial relationships, 2) the link across

the LRD and MECS to create plant-level energy prices, and 3) the forecasting equations that can be used to impute non-response to energy questions in the ASM and MECS.

Modal Choice in Product Shipments
Gale Boyd, Argonne National Laboratory
Marianne Mintz, Argonne National Laboratory
Anant Vyas, Argonne National Laboratory

Modal choice of product shipments has changed in the last 20 years. This has implications for the shipping sector, transportation patterns, energy use, and pollution. This project examines the detailed data from the Commodity Flow Survey (CFS) linked to the LRD to estimate a model of mode choice. The National Energy Modeling system (NEMS) uses freight mode choice to forecast energy use in this sector, but is based on fixed shares from the 1977 CFS. The aggregate data show large shift in mode with higher value products are more likely to use premium shipment modes, like air freight. However, the aggregate data is insufficient to estimate the combined effects of shipper and shipment specific effects that the linked CFS and LRD can provide. This project estimates the industry and product specific determinants of this underlying economic choice that can be used in NEMS to improve its forecasting capability. The benefits to Census include linkages across entities in the CFS and LRD that may lead to a harmonization of the commodity definitions, quality estimates of the CFS value of shipments estimates, additional population characteristics on transportation mode choice and better imputation for non-response.

Multi-product Firm's Investment and Diversification Decisions
Namsuk Kim, University of Maryland

During business cycles, firms adjust various margins. Research using plant-level data unmask the plant-level investment path. However, many decisions are made at the firm level. This project explores one of the margins that a firm can adjust during the business cycle; to wit, product diversification. I set up a suggestive model, showing diversification, investment and debt policy. My project will analyze why, when and how the firm diversifies, which is not done in the existing literature. Diversification decisions would be one of the possible reasons why the firm's investment is lumpy and traditional investment and inventory models cannot explain investment. My project is consistent with other research that is beginning to analyze various adjustment margins of the firm.

Along with the simulation results from my model, I will find new stylized facts of the annual pattern of firm's diversification at firm and plant level. I have three approaches to do so, dealing with certainty company cases, single units, and multi units. The first two approaches require the ASM and CM. The last one needs LBD data as well. My project will compare three datasets and evaluate their analytical abilities. Three datasets can be combined to overcome the defects of each of the datasets.

Information Technology and Productivity

The Impact of Workplace and Technological Innovations on the Demand for Less Skilled Labor: A Study of Three Industries
Ann P. Bartel, Columbia University
Casey Ichniowski, Columbia University
Kathryn Shaw, Carnegie Mellon University

There is evidence that firms require more skilled labor on the production line. This evidence shows that production workers' education levels are rising and that income inequality is growing, with higher returns to education even within production worker categories. An increase in skill demand may

well arise from the greater computerization or technological improvements that are taking place within manufacturing. Greater skill demand may also arise from the adoption of more innovative human resource practices that put greater decision-making power in the hands of production workers. More specifically, as information technologies put more information in the hands of production workers, they are more likely to require greater reading, math, and problem-solving skills to make use of that information.

In this project, we propose to test the hypothesis that greater levels of information technology, increased technological improvements, and innovative HR practices have elevated the skill requirements for production workers. This hypothesis will be tested using data from three industries—steel, fabricated metals, and medical instruments. We propose to undertake our own surveys of plants in these industries to gather data on the types of computerization or information technologies, the use of specific production technologies, human resource practices and skill requirements. The questions on these surveys will be specific to each industry. These data will be matched with data on wages, employment and value added from the LRD in order to build a panel data set of plant level practices and outcomes.

We propose to do regression analysis of the effects of new technologies on a number of different dependent variables: the average wage level; the wage ratio for production versus non-production employees; the number of production versus non-production employees; and measures of the types of skills demanded (from our own surveys). The results should provide insights into the types of skills and training that are required in manufacturing today, and the impact on wages, all arising from technological changes. The analysis of new industry-specific technologies and innovative HRM practices will contribute to the literature in several important ways. First, while many studies suggest that new computer-based technologies have contributed to the demand for more skilled workers, the measures of technology used in existing studies are not persuasive because they are not specific to individual industries and plants. Here, we propose to measure actual technological advances in three industries and examine how the skill requirements of plants that adopt these technologies differ from the skill requirements of plants without these technologies. Second, despite claims that new HRM practices that promote more employee participation require a different kind of worker, no existing study examines the impact of work practice innovations that have emerged in American industry in the last twenty years on workers' skill requirements. The research we propose here will fill these gaps.

This project will assist the Census Bureau by: understanding or improving the quality of the Census surveys; enhancing the data that are collected; and identifying shortcomings of current data collection programs or new data collection needs. We propose to undertake surveys of plant-level hiring needs and the technology in use in three industries; steel, fabricated metal, and medical instruments. The surveys will be very similar across the three industries, but will differ in the questions that address industry specific technologies. Our focus will be on the information technology in use on the plant floor. The surveys will also contain questions on network use within plants that are identical to those in the ASM supplement on Computer Network Use. Our surveys will then be matched to the LRD data. Using the resulting matched data set, we will find out whether network use within plants, as measured by the ASM supplement, is correlated with other technological improvements on the production line. These matched surveys would enhance the Census Bureau's knowledge of these manufacturing industries and evaluate the quality of the new data collected by the Computer Network supplement. Additionally, the methodology developed by this project for linking supplemental datasets in a panel format will provide an illustration of how these data series can be linked and then used to conduct similar research in other manufacturing areas, thereby extending the usefulness of the LRD. This project will determine whether there are industry differences in the way plants interpret and answer the network use questions included on the ASM Computer Network Use supplement, and thus suggest whether future adjustments to these questions are necessary. This research will allow us to assess whether our technology questions might be considered valuable in a future ASM surveys— surveys such as the industry-specific supplements or the Computer Network Use supplement.

The Role of Information Technology in Production

Daniel Akerberg, University of California Los Angeles

Kevin Caves, University of California Los Angeles

Information technology (IT) plays a key role in theoretical explanations of economic trends, which are the subject of some of the more important economic policy debates of our time. We propose to study the productive role of IT by matching data on computer use in the workplace from the Current Population Survey (CPS) with plant-level production data from the Longitudinal Research Database (LRD). We plan to employ a new econometric technique for estimating production functions, which allows us to test whether IT affects plants' total factor productivity (TFP), in addition to allowing for tests of whether IT causes information to flow more efficiently through firms.

An important objective of this study will be to prepare estimates of production function parameters and TFP for the manufacturing industries using a new technique, which is designed to produce more accurate estimates than older methods. As we explain in the Project Description and in the Predominant Purpose Statement, the accurate measurement of TFP is directly relevant to the Census Bureau's stated mission. To study the role of IT in production, we plan to use information on IT usage from both the CPS and the LRD, two sources that are actually complementary to each other. These two surveys provide, among other things, conceptually distinct measures of IT adoption.

The CES datasets required for estimation consist of the datasets that comprise the LRD: the Annual Survey of Manufactures and the Census of Manufactures. Because our techniques employ nonparametric econometrics, it will be vital to have as many observations as possible to ensure efficient production function parameter estimates. Therefore, we would request access to all years for which data is available for the LRD. (This would include the years 1963, 1967 and 1972-2001). Because we will often be making comparisons at the *industry* level to study the role of IT in the production process, we need to obtain data from as many industries as possible in order to make accurate inferences. Therefore, we would request access to data on all manufacturing industries.

All additional data required for the project will be publicly available and would be supplied by the researchers. This includes data on the prices of inputs and outputs, which will be necessary to transform the nominal data from the LRD into real variables. For most years (1963-1996), data from the NBER-CES manufacturing productivity database will suffice. For subsequent years, it may be necessary to obtain the relevant price series directly from the Bureau of Labor Statistics and the Bureau of Economic Analysis. Note that our methodology does not require us to observe input prices at the plant level. The other dataset we will employ is the public use version of the Current Population Survey (CPS). Questions on computer use are included in the following years of the CPS: 1984, 1989, 1993, 1994, 1997, 1998, 2000, and 2001. Moreover, in several of the years listed above, the CPS asked respondents about the specific types of computer applications they used at work. We plan to make use of this data, in addition to CPS data on the industry classification and the relevant statistical weight of the respondents. We will match the CPS data with the LRD data using 3-digit industry codes.

Information Technology and Organizational Capital

Erik Brynjolfsson, Massachusetts Institute of Technology

Lorin Hitt, University of Pennsylvania, Wharton School

Adam Saunders, Massachusetts Institute of Technology

Shinkyu Yang, Massachusetts Institute of Technology

In order to realize the potential benefits of computerization, investments in additional assets such as organizational processes and worker knowledge may be needed. We propose to investigate this hypothesis by combining our own data with that of the Census towards finding new ways of measuring organizational capital and how firms can best take advantage of technology. In particular, by assisting the Census Bureau in measuring these changes to the supply chain, we aim to increase the Census Bureau's knowledge base in understanding the broader implications of technology in the workplace. Our research may shed light on the nature of the recent productivity revival and clarify the

factors that are most important to its future sustainability.

Our aim is that our research will enable the Census Bureau to assess the benefits of collecting data to better measure these technology-enabled complementary investments, in particular, within the context of the eStats program. At the moment, the majority of the eStats program is dedicated to measuring ecommerce revenue, such as B2C or B2B revenues. While ecommerce is an important feature of the new economy, we believe that our work will show that selling products online is only one of many ways that firms can leverage the power of information technology (IT) to create value. To look at only ecommerce revenues would be missing the broader change in the economy that is taking place: *Information technology has compelled firms to reorganize themselves in new ways by reinventing and changing their business processes.* We believe it would be worthwhile to more directly measure the underlying data behind this phenomenon.

We also will help the Bureau explore ways to provide better statistics on the implications of changing technologies to the supply chain. In the past decade, firms have used information technology to change the allocation information, decision rights, incentives and ownership across firm boundaries. As the CIO of Nokia, Mikko Kosonen, recently noted at the 2004 MIT CIO Summit, new technologies have led to the emergence of an “extended enterprise”. These kinds of changes in the supply chain suggest a broader data gathering agenda about nature and scope of the benefits of computers and communications. Furthermore, they raise fundamental questions about the basic unit of measurement. Should it be the plant, the firm, or perhaps, the whole value chain? We believe that our approach can help address these questions and lay the foundation for improved statistics and methodologies in coming years.

Using a small sample of Fortune 1000 firms, our previous work has shown that the combination of organizational capital and computer investment together drive higher market values and higher productivity. In our project at the Census Bureau, we plan to extend this analysis along the following dimensions: 1) Understand the effects of organizational capital after 1997; 2) Aggregate Census measures of plant-level investment data to create a database of computer investment by firm, and use estimating techniques to create IT stock by firm; and 3) Use Census measures of Internet use as a proxy for organizational capital. These techniques will enable us to widen our earlier analysis to include thousands of firms of all sizes, across all sectors of the economy.

Technology Use & Worker Outcomes: Evidence from Linked Employer Employee Data

Javier Miranda, JM Economic Research

Adela Luque, University Pablo de Olavide, Department of Economics and Business

There is widespread evidence that in the last few decades there has been a widening gap between the wages of skilled and unskilled workers. Numerous empirical studies suggest there is a link between this growing skill wage differential and the use of new technologies. However, most of these studies have one notable limitation – i.e., they are typically restricted to cross-sectional data, and thus, unable to control for unobservable worker and firm characteristics. This makes it difficult to distinguish the effects of selection bias from the true productivity effects of using these technologies. Distinguishing these two components ideally requires longitudinal information from both workers and firms. With this project we intend to investigate the impact technology use has on workers' wages in U.S. manufacturing plants by constructing and exploiting a unique Linked Employee-Employer data set containing longitudinal worker and plant information. Among other things, the construction of this dataset will develop links across time and entities using census data and administrative data, will also explore the value of administrative data to provide economic information to enhance census surveys, and furthermore, will identify some shortcomings of census collection programs.

We will examine the effect of technology use on wage determination and ask the following questions: Does the skill wage differential increase after the implementation of new technologies in the workplace as suggested by the skill biased technological change hypothesis? Or do high tech firms employ a selection of high ability workers? And if demand for low skilled workers indeed falls after the

introduction of new technologies, do we observe the adjustment of prices or quantities? Does the hazard of exiting the firm increase for low skilled workers after the introduction of new technologies? Is skill upgrading a consequence of technology adoption? This project will address these questions using the Long Form of the 1990 Decennial Census, the Survey of Manufacturing Technologies (1988 and 1993), the Business Register (SSEL 1985-1997), and Unemployment Insurance data for the state of Maryland.

Vertical Linkages and Investment Decisions

Robert H. Porter, Northwestern University
Allan Collard-Wexler, Northwestern University
Shane Greenstein, Northwestern University

This project will examine supplier-customer relationships (also known as vertical linkages) and the impact of these relationships on investment decisions. The Census Bureau has explicitly stated a need for “specific recommendations regarding how to better capture and describe supply chain activities in the 2002 Economic Census and in our current economic statistics” (Mesenbourg 2001). This project will develop a methodology to capture and describe these supply chain activities using internal Census economic microdata (Census of Manufacturing, Annual Survey of Manufacturing, Census of Construction, Longitudinal Business Database, Survey of Plant Capacity Utilization) combined with Input-Output Tables of the American Economy compiled by the Bureau of Economic Analysis, and will provide this methodology to Census. In addition, knowledge gained from these analyses will be used to address several data quality issues in these data sets (i.e., studying patterns of non-response, developing new imputation methods, conducting consistency checks). The project will then use these relationship measures to examine firms’ decisions to adopt electronic commerce infrastructure based on their suppliers’ and customers’ actions as well as to examine capital investment decisions by ready-mix concrete plants based on downstream local construction activity. Hence, this project will not only benefit the Census Bureau by producing a methodology to capture and describe these supply chains but will also provide knowledge useful for addressing a multitude of data quality issues.

Vertical linkages between firms play an enormous role in the functioning of the economy. A large fraction of output from plants across the country is not consumed by individuals but is utilized in other firms’ production processes. These linkages are key to explaining investment behavior -- if a firm’s customers are growing rapidly, it is apt to expand its operations to meet future demand. The two applications chosen for this project, enumerated above, have a guiding methodological principle: the use of information about the relationships between firms, either sectors that trade with each other in the case of e-commerce or concrete plants that sell neighboring construction projects, to understand why firms make capital investments. Since both applications of these projects study firm-level decisions, non-public Census data are required. This project will primarily use data from the Longitudinal Research Database (i.e., the longitudinally linked conjunction of the Census of Manufacturing and the ASM) but will also use data from the Census of Construction, the Longitudinal Business Database, and the Survey of Plant Capacity Utilization.

Taxis and Technology:

Contracting with Drivers and the Diffusion of Computerized Dispatching

Tim Simcoe, University of Toronto
Evan Rawley, University of California at Berkeley

This project will attempt to measure the productivity benefits of using computers in taxicab dispatching. It will also test the hypothesis that these benefits depend on the contractual relationship between drivers and dispatchers. These questions are of interest to scholars of technology and productivity growth and to organizational economists interested in contractual relationships within the firm. The data used in this study would include establishment-level information on taxicab fleets

collected by the Bureau of the Census, publicly available industry data provided by the Taxicab, Livery and Paratransit Association (TLPA), firm-level survey data collected by the TLPA in cooperation with the Department of Transportation, and data on technology adoption supplied by vendors of computerized dispatch technology.

The proposed study would be the first Research Data Center project to utilize data from the Economic Census' Transportation Survey. In addition to cleaning and documenting this data, the project would contribute several new fields to the CES/RDC database. The data collected from independent industry sources will be used to validate Census' tracking of establishments in an industry characterized by significant levels of entry and exit. Finally, the research project will lead to a better understanding of the private transportation industry that may lead to improvements in future data collection and survey design.

International trade

The Impact of Foreign Trade on the U.S. Economy

J. Bradford Jensen, Institute for International Economics

Andrew Bernard, Tuck School of Business

Peter Schott, Yale School of Management

The project will proceed in three phases. The first will enhance the export and import information on Economic Censuses and Surveys. We will develop and test linkages between transaction level Foreign Trade data and Economic Census and Survey data and compare the links developed by CES to those developed by the Census Bureau's Foreign Trade Division (FTD). If improvements in linkages methods are identified, we will provide advice to FTD. The second phase will analyze transaction level detail to examine changes in foreign trade transactions, focusing initially on related party transactions, potential underreporting, and impact of FTD outreach efforts. This component of the project will focus on identifying reasons for such changes. The third phase of the project will develop empirical and analytical framework to investigate the impact of trade on the U.S. economy - focusing on how firms allocate economic activity between domestic and foreign production and the impact of this on the domestic economy (including workers and regional economies). This component makes use of the data developed in the previous phases to develop new estimates of the impact of foreign trade on U.S. industries. It will examine how imports and exports affect domestic production, employment, and productivity. It will also examine how firm responses to trade affect local labor market outcomes.

The Impacts of Administered Trade on Productivity in the United States

Jim Levinsohn, University of Michigan

Chris Kurz, Center for Economic Studies

An economic evaluation of how plants respond to particular instances of administered protection would improve Census Bureau data, general decision-making capabilities, and the understanding of the plant-level impacts of protection. Administered trade is extended through various segments of the federal government to industries under duress from unfair trade practices. The actual impacts of such trade policy actions are unclear, both practically and academically. To perform such an analysis on productivity, manufacturing establishment data is necessary. No such data is currently publicly available, making the availability of a Research Data Center integral in making progress to clarify the impacts of protection at plant-level.

The potential benefits to the Census Bureau are significant and comply with the Title 13, chapter 5 program requirements. This project intends to prepare estimates of productivity for certain industries, thereby adding to available estimates that describe the characteristics of the Longitudinal

Research Database (LRD). Possible shortcomings and the documentation of new data collection needs will derive from our comparisons of estimated industry productivity for actual Annual Survey of Manufactures respondents and estimates based of LRD imputations for non-respondents. Differences may be significant between the two, due to the disparities in the possible conditions of plants used for imputation relative to the state of plants for which data was imputed. Lastly, this project intends to help understand LRD based estimates of productivity in relation to alternative productivity measures.

Economic Integration And Labor Demand Elasticities

Mine Z. Senses, University of Michigan

This study intends to examine the effects of increased economic integration on labor demand elasticities of skilled and unskilled labor, focusing on the effects of international trade, specifically outsourcing, as well as increased capital flows. Rodrik (1997) suggests that increased possibility of substituting domestic labor with its foreign counterparts through outsourcing and foreign direct investment should make labor demand more elastic. Greater product markets competition is also likely to flatten the labor demand curve. More intense competition in the final goods market is observed due to decline in trade protection and entry of less developed nations into production in manufacturing sector as a result of increased transmission of technology worldwide. The validity of the Rodrik hypothesis will be tested for the US manufacturing sector using plant-level data from the Census Bureau's Annual Survey of Manufactures and the Census of Manufacturers for 1972 to 2001.

The benefits of this project to the Census Bureau are significant and comply with the Title 13, chapter 5 program requirements. This project will increase the Census Bureau's knowledge base through the estimation of labor demand elasticities and the impact of economic integration upon these estimated elasticities over the 1972-2001 period for establishments in the Annual Survey of Manufactures and the Census of Manufacturers. A second benefit of this project will be understanding and/or improving the quality of data produced, by attempting to identify possible directions and magnitudes of the biases in the estimated coefficients resulting from the inclusion of imputed variables. I also intend to compile a summary of information regarding imputations throughout the Annual Survey of Manufactures and the Census of Manufacturers in order to assist further research using this dataset. Final benefit of this study to the Census Bureau will be enhancing the data collected, by improving imputations for non-response. I will identify possible problems with the imputation techniques used regarding the usage of prior survey information on payroll and employment to predict currently unavailable data, in conjunction with current year BLS aggregates.

Import Competition for Domestic Producers: Broadwoven Textiles

Patrick Conway, University of North Carolina at Chapel Hill

The US manufacturing sector as a whole has faced increasing international competition in the last generation, but competition was especially intense in textiles and apparel production. It is crucial, both for our understanding of economic forces as well as for decision-making, that the determinants of this evolution be disentangled. I propose to investigate the causes of this decline through empirical examination of production and trade in subsectors of the US textile and apparel industries. In the textile sector the production of broadwoven cotton cloth has stagnated over the last 20 years while the production sub-categories of broadwoven cotton has expanded. I will document the differences in historical performance, and then use plant-level data from the US Census of Manufactures to identify the relevant determinants of this divergence. The methodology used will be regression-based, with semi-parametric techniques used when appropriate. The result will be a decomposition of the observed evolution in employment, wages, productivity and investment in these industries into that attributable to import competition and that attributable to specific other causes.

Access to the non-public data of the US Census Bureau, specifically to the Longitudinal Research Database (LRD), will provide consistent links between the plant-level data of the LRD and

the data on international trade and finance found in public databases that will be useful in welfare analyses of trade and globalization. Specifically, links to data on binding quotas in these industries will be created. The project also will provide documentation of potentially useful additions to the Census questionnaire to address the question of unemployment due to trade-related dislocation, as specified in the Trade Adjustment Act and other legislation of the US Congress. Finally, the project will provide an example of the application of a profit-maximization based estimating structure upon the data for the manufacturing plants of the LRD.

Trade, Employment and Inequality: An Investigation of Rural Economic Change

Robin Leichenko, Rutgers University

The goal of this project is to improve the utility of Census Bureau data by providing new measures of the impacts of U.S. international manufacturing trade on employment, wages, and income inequality in rural (nonmetro) counties of the United States. The project, which is funded through a grant from the National Research Initiative's Competitive Grants Program, U.S. Department of Agriculture, involves two components: 1) regression analysis of the employment impacts of international trade on rural counties and 2) regression analysis of the impacts of international trade on wages and income inequality within and across rural counties. The project will utilize 4-digit industrial shipment and foreign export shipment data from the Longitudinal Research Database (LRD). The LRD data will be aggregated to the county-level and will be linked with 4-digit international import and export data and exchange rate data to create a unique, county-level, international export and import exchange rate dataset. This new dataset will be used to estimate via regression modeling the county-level employment, income and wage effects of changing patterns of international trade between 1972 and 1997. The employment and wage models will also utilize LRD data on average, production, and non-production worker manufacturing employment wages. Other data for the project will come from publicly available sources including the Regional Economic Information Systems (REIS) data series and the Census of Population. In addition to providing new estimates of the impacts of trade on rural manufacturing, other contributions of the project to Census Bureau programs include improving understanding of the quality of data collected in a Title 13, Chapter 5 census, and enhancing the data collected in a Title 13, Chapter 5 census. Improved understanding of the quality of census data will be accomplished through analysis of the 1997 export estimates. These estimates, which have not yet been evaluated in comparison to prior census years, will be compared to export measures in the 1987 and 1992 Economic Censuses. Enhancement of the data collected in the Economic Census will be accomplished through development of a new dataset that relates international trade patterns to rural manufacturing.

Labor market dynamics

Understanding the Behavior of Job Flows over the Business Cycle

Andrew Figura, Board of Governors of the Federal Reserve System

The project I am proposing will contribute in four ways to the understanding and improvement of Census data: first, it will develop filtering and flagging programs, which will identify unusual and potentially spurious observations for plants in the Annual Survey of Manufacturers (ASM). Second, it will also estimate or impute data for missing observations or observations deemed likely to be spurious. Third, because the project estimates population moments from relatively long panels of plants, it will further the understanding of the representativeness and usefulness of estimates constructed from longitudinal data. Finally, the project will further the understanding of the dynamic behavior of plants, in particular their demand for labor. In this regard, the project proposes to answer two sets of questions related to the behavior of plant level employment: (1) do plants time their restructuring activities to correspond with fluctuations in the business cycle and if so, which types of plants are more likely to do so, and (2) are there asymmetric movements in job flows at the plant level and do these plant-level

asymmetric movements, if they exist, translate into asymmetric job flow movements at the aggregate level. Answering these questions requires the construction of panels of plants from the ASM, with panels grouped by relevant plant characteristics, such as size and industry. To prevent spurious data from contaminating results, I will filter out or flag unusual patterns in plants' time series of characteristics as well as impute data that is either missing or appears spurious. To appropriately interpret my results, I will compare characteristics of plants from my longitudinal samples to the overall ASM, evaluating the representativeness, and hence the usefulness, of estimates constructed from longitudinal data.

The data sets I will need are the ASM from 1972 to the most recent available and the Census of Manufacturers (CM) from 1967 to the most recent available. Considerable processing of this data has already been performed in the construction of data files for the Gross Flows project. Thus, I would also like to have access to many of the files constructed from the ASM and the CM in the Gross Flows project.

**Monitoring Welfare to Work in the Survey of Income and Program Participation (SIPP):
1990-1999**

Andrew Hildreth, University of California-Berkeley
David Card, University of California-Berkeley
Joe Hotz, University of California-Los Angeles
Philip Hardiman, Labor Market Information Division, California
Lara Shore-Sheppard, Williams College, Massachusetts

This proposal describes a project that will examine the accuracy of measurement of dynamic labor market behavior in the Survey of Income and Program Participation (SIPP). The key feature of the project is the use of longitudinal records from the Unemployment Insurance (UI) system and the MEDS (Medicaid Eligibility Database System) of the State of California to provide accurate information on welfare, employment, unemployment, and earnings outcomes of individuals in the Census surveys. The project will link individual records from California residents in the SIPP with UI base wage records and records from the state's MEDS file, and use the combined data set to address a series of questions related to the welfare-to-work transition of former welfare recipients. The combined data set will also be used to examine the divergence in measures of employment and earnings derived from household surveys compared to the known events contained in administrative files.

Recent initiatives at the federal level, and subsequent state welfare legislation, have focused renewed attention on the ability of existing Census survey data to track trends in program participation and measure changes in welfare-to-work. Further, at a time when the State of California has grown faster, but started at a later date than other states, there are questions over the stability of jobs that individuals leaving welfare might receive. The proposed research seeks to address a number of issues in examining economic problems relating to welfare-to-work and the construction of matched employer-employee data.

As well as providing evidence on important questions, there will be substantial scientific contributions from the work (that enhance and identify shortcomings in Census Chapter 13, Title 5 data programs). The scientific questions to be addressed concern the representative quality of the matched data once it has been formed and a means to address issues in the Census data such as measurement error and attrition bias. This work builds the research in earlier work conducted at the CCRDC. The main purpose of this work is to use data that has already been linked by the Linked Employer Household Dynamics (LEHD) project to combine this SIPP-UI linked data with another administrative data source to examine how various models perform using matched data. This proposal has implications for improving Census data products. As part of our method, we are performing quality checks on Census data that are outside the LEHD task list and complement their data program, and the mission of the Census as a whole.

**Using Matched Employee Data to Examine Labor Market Dynamics and the Quality of
DWS/CPS Data in California, 1991-2000**

Andrew Hildreth, University of California-Berkeley

David Card, University of California-Berkeley

Till von Wachter, Columbia University

Elizabeth Weber, University of California-Berkeley

The project will link individual records for California residents in the Displaced Worker Supplements (DWS) (conducted in February 1994, February 1996, February 1998, and February 2000), with the March Current Population Survey files for 1991-2000 and the California Base Wage records 1991-2000. The proposed research seeks to address a number of issues in understanding how and why an individual loses their job using matched employee data.

From the outset, the DWS was designed to elicit responses on the displacement of workers. Displacement was defined as being laid-off (without recall), a plant closing, or the employer going out of business. This is separate from a workers wish to quit or leave a job for their own reasons. As well as providing evidence on the accuracy of the DWS in measuring the cost of job displacement, there will be substantial scientific and benefit to the bureau contributions from the work (that enhance and identify shortcomings in Census Chapter 13, Title 5 data programs). The work will conduct an assessment of the accuracy and shortcomings of the DWS in measuring the displacement of workers, of compiling displacement statistics, and measuring the cost of job loss.

In particular, the scientific and bureau benefits are the following. First, the work will assess the importance of missing information on workers in the DWS. In particular, the work history and the measurement of wages can both be learned from the UI Base Wage files and their importance assessed. By including these two items into the DWS file, the analysis will be able to assess directly the importance of the missing information on job history, and the problems of reporting a retrospective wage for the last job for the displaced workers. Both of these items will impact how the wage change from displacement is estimated from the DWS. Second, assess the representative quality of the measurement of displacement against other sources of information. Matching the DWS to the UI Base Wage files, a more complete investigation is possible on the measurement of displacement from the 'plant closed down' response in the DWS. The UI Base Wage files can determine when a plant closed down through a change in the number of workers at a particular employer. This will directly assess how researchers view the representative quality of the DWS in its estimate of displacement figures.

As part of the Benefit to the Bureau, the research will provide technical memorandum describing the data base development and the differences between displacement statistics, pre and post displacement wages, and the reason for job loss. The technical memorandum will also address the implications for the Census Bureau's data collection program. In particular, the usefulness of questions on displacement, the accuracy of recalling past wages, and the importance of missing information on the job loss between main employment spells.

Firms and Layoffs:

Using the 1997 NES to Examine Unionization and Involuntary Job Loss

Vanessa V. Tinsley, Duke University

The National Employer Survey (NES) was administered by the Census Bureau on behalf of the Educational Quality of the Workforce Program to conduct a survey on employers' hiring and human resource practices. The proposed project extends the use of the NES beyond the issues of training and education and informs broader labor market issues by focusing on variable data that has been collected but has not been extensively used. In doing so, this project will yield clear benefits to the Census Bureau's data program.

The 1997 National Employer Survey – Phase II is one of very few employer surveys that contains data on involuntary job loss and collective bargaining coverage at the establishment level. An

important human resource issue is how employers manage changes in employment levels. Employers in the United States have been facing increasing pressure to eliminate jobs; thus, employees are experiencing a decline in job security. Unions, as the only institutionalized means of worker representation, can be expected to have an impact on whether or not management considers workers' interests when making decisions regarding changes in employment levels. This project merges the NES establishment-level data with industry-level and local labor market characteristics to identify factors affecting involuntary job loss, with a particular focus on unionization.

Access to non-public data provide the Census Bureau data program with the following benefits: (1) an enhanced database created by merging NES-II data with contextual data such as the Herfindahl Index, industry unionization rates, local unemployment rates, industrial production indexes, and industry imports, allowing comparisons with the AMA and MCTES data; (2) an increased understanding of the quality of the data for use in econometric analyses and an evaluation of the quality of the data by comparing coefficient estimates to estimates obtained from the AMA and MCTES data; and (3) documentation for new data collection needs to understand employer behavior.

Migration and Immigration

Health and Migration in the Continental United States

Arline T. Geronimus, University of Michigan

John Bound, University of Michigan

Mounting evidence that similar individuals residing in different places have varying life chances has given rise to the possibility that racially-segregated urban environments have a particularly insidious impact on the health of African American residents of high poverty urban areas.

However, observed geographic patterning of health outcomes might also reflect systematic health-related migration across local residential areas -- for example, the in- or out- migration of the most or least healthy residents into high poverty urban areas. Research on this issue is scant because few data sets link health and migration. The Census could be an ideal source for studying this important area, yet, it is largely an untapped resource.

Our project has been scientifically reviewed, approved, and funded by the National Institute on Aging (NIA), one of the National Institutes of Health (NIH). Our primary goal is to test the hypothesis that selective health-related migration affects geographic variations in local population health. To do so, we will need to analyze confidential data from responses to the Census question that asks respondents to the 1990 and 2000 decennial Censuses where they resided 5 years earlier. Thus, for our work at the Research Data Center, we propose to use the Sample Edited Detail File (SEDF) of the 1990 Decennial Census, and the similar data from the 2000 census when it becomes available. The SEDF represents roughly 16% of the population and includes all the long-form records including the critical question on prior residence that is not available on the public use files released by the Census Bureau.

Of benefit to the Bureau, this project will improve understanding of the quality of Census data and improve Census-based estimates of local population health. Should we find that health related migration biases estimates of population health, this will identify shortcomings of current data collection and document new data collection needs. Meanwhile, we will be preparing estimates of population and characteristics of population as authorized under Title 13, Chapter 5.

By estimating disability rates for select high poverty and minority populations, taking selective health-related migration into account, we will provide more accurate estimates of the health status of these local populations than currently exist. In addition, our study will shed light on the feasibility of using the Census to study short distance moves and will enable us to determine the extent and nature of missing data on relevant items. If our results support the value of using detailed geography when studying migration patterns, it would suggest that, subject to other considerations, the Census might

consider including more detailed geographic information, such as census tract of prior residence, in the data released for use at Research Data Centers, so that investigators do not have to rely on “county” or census “place” of prior residence.

Rural Civic Community and Population Stability: Linking Civic Structure and Individual Migration Behavior

Michael Irwin, Duquesne University
Troy Blanchard, Mississippi State University

Many rural communities are losing economically and socially viable populations, tax bases, essential services, and retail establishments. But, there are also cases of rural communities that are thriving and, in doing so, are retaining their populations and stemming the tide of rural out-migration. Our proposed research will evaluate the factors that aid rural communities in retaining their population. Specifically this research will analyze the effect of the civic institution in rural communities (such as churches, local businesses and local associations) upon individuals – probabilities of staying in their communities. Individual migration/nonmigration behavior will be modeled using the full internal decennial microdata for 1990 and 2000 (as it becomes available). County contextual effects on these individual behaviors will be modeled using internal Economic Census microdata from 1982, 1987, 1992 and 1997 as well as from publicly available county level data (such as the Census of Agriculture). The individual models will summarize the effects of individual economic, demographic and social characteristics that affect migration/nonmigration behavior. County contextual effects will quantify the influence of community economic conditions and social conditions that alter these individual behavioral models. Assessment of these contextual estimates will summarize the degree to which community structure alters individual behavior. Thus our research objectives are first to specify the relationship between rural community context and individual migration behavior, and second to test the relative importance of individual characteristics, community economic characteristics and community social characteristics in retaining rural populations.

Our approach will also provide a number of benefits to the US Census Bureau. These benefits include linking decennial and economic data over time at the county level and linking the decennial time series and economic census time series on counties together. Further we will provide an important alternative measurement for migration in these data, by evaluating two measures of migration – cross county migration and cross labor market migration. This latter definition may provide a clear demarcation between purely residential movements within a community and economically determined movements between communities. Comparison of predictive estimates for the two types of migration will quantify these differences. We believe our project will also provide an important quality assessment of the 2000 decennial data. By linking 1990 to 2000 data, then modeling individual migration behaviors (and relevant characteristics) we will provide a unique quality assessment of the 2000 data. Our research approach models individual behaviors at the county level and assesses contextual differences among counties in these predicted behaviors. As we evaluate the stability of individual migration behavior within each county in 1990 and 2000 we will identify counties where sharp changes in our predictive models occur, and assess whether such differences are due to changes in contextual conditions or are artifacts of Census coverage in the two time periods.

U.S. Minority Migration and Metropolitan Change

William H. Frey, University of Michigan
Kao-Lee Liaw, McMaster University
Yu Xie, University of Michigan

The project seeks to evaluate race-ethnic selective migration processes in the US and their impacts on large metropolitan areas. It will employ the “residence 5 years ago” question for successive censuses to determine if immigration and internal migration processes are leading to greater dispersion of the nation’s detailed race-and ethnic groups across metropolitan areas. It will also evaluate the consistency and accuracy of “residence 5 years ago” responses over time for race-ethnic groups. The

project will use the Michigan RDC to analyze census long form data from the 1990 and 2000 Censuses. If it becomes available during the course of this project, the analysis will also incorporate data from the 1980 Census.

The concentration of Hispanic and Asian populations in New York, Los Angeles, and a few other large metropolitan areas is related to their recent immigrant status and attachments to co-ethnic communities in those areas. (Liaw and Frey, 1998; Gober, 2000, Waldinger, 2001). Yet, recent Census 2000 results suggest their greater geographic dispersal (Frey, 2002c, Suro and Singer, 2002). The African-American population, while less concentrated than these groups, has shown an increased tendency to relocate in the South countering a long-standing movement in the reverse direction (Frey 2001b). Using a variety of demographic techniques, and migration models, we will assess the extent to which migration processes are leading to even further dispersal of race-ethnic groups by examining inter-metropolitan migration across the nation's large metropolitan areas over the periods, 1985-90, 1995-2000 (and if data become available during this project), 1975-80. The proposed migration research will benefit the Census Bureau's Population Division by: providing information relevant to the quality, possible new tabulations, imputations and additional collection needs of race-ethnic data based on the decennial census "residence 5 years ago" question as it applies to different facets of the Division's work on migration and race/ethnic identification, and subnational population estimates and projections. To this end, the migration analyses will focus on identifying heterogeneity of migration patterns for specific race and ethnic groups (or combinations thereof) within the broad race and ethnic groups that are usually included in the full sample release of migration information in standard Census summary files, publications, and in their estimation and projection models. The above analyses will shed light on data quality and measurement issues. For example, the comparison of one race alone (eg. whites) migration patterns with those for that race in combination with others (e.g., whites in combinations with others) in 2000, and for that race in 1990 will shed light on the utility of using the former as a proxy for a given race, when comparing patterns over time. Our migration models which include parameters for nativity, and year of entry can also inform the Census Bureau's post-censal estimate and projection procedures which incorporate race—ethnic specific migration assumptions.

Pollution Abatement

Regulating Pollution Through Information Disclosure: Facility Response to the Toxics Release Inventory Lori Brennear, Harvard University

There is increasing interest in the United States and other countries in the use of information disclosure programs as potential substitutes for, or complements to, conventional command-and control or market-based environmental policy instruments. Much of this interest can be attributed to the apparent success of the Toxics Release Inventory (TRI) program, which requires large manufacturing facilities to report publicly their annual releases of certain chemicals. Since the inception of the TRI program in 1986, reported releases of over 300 regulated chemicals have fallen by more than 45 percent. However, since release data is only available for facilities that are required to report to TRI, one cannot determine what reductions in releases would have occurred in the absence of TRI and, therefore, one cannot infer how much of this 45 percent reduction is the direct result of the TRI reporting requirements. The primary purpose of the proposed research is to better isolate the causal effect of TRI on facility-level outcomes. To accomplish this, it is necessary to recognize that the production of toxic releases at a facility is directly linked to production of output at the facility. While we cannot observe releases for facilities that are not required to report to TRI, we can observe output levels for both facilities that are required to report and facilities that are not required to report. This framework can be used to develop a natural experiment for testing the effects of TRI on production technologies and productivity.

We will estimate production functions separately for facilities that are required to report to TRI

and facilities that are not required to report to TRI and empirically test for differences in the production technologies employed and the productivity of the two groups of facilities. This will help determine whether public disclosure of environmental performance information changes the way facilities do business. In addition, this project will provide a better understanding of the ways in which public disclosure affects facility decision-making. There are several pathways through which reporting of environmental information might lead to pollution reduction, including: green consumerism, green investing, community pressure, the threat of future regulation, and organizational limitations of the firm. We will construct indicators for each of the pathways, estimate the effect of these pathways on changes in the production functions used by reporting and non-reporting facilities, and compare these effects with predictions from a theoretical model of facility-level response to information disclosure requirements.

A critical element in the analysis is the construction of a facility-level dataset that contains information on environmental variables, economic variables, and variables that proxy for the four different pathways. We will create this dataset by linking publicly available data from the Toxics Release Inventory, trade organizations, environmental organizations, and other sources with confidential facility-level economic data from the Longitudinal Research Database (LRD) and the Pollution Abatement Costs and Expenditures (PACE) Survey for the years 1982 to 1999. In addition to providing a clearer understanding of the causal relationship between TRI and facility-level economic outcomes, the creation of this unique dataset will provide opportunities to evaluate and enhance Census data. The Census collects detailed data on the products produced, and the materials used in production, at the 7-digit SIC level (8-digit NAICS level beginning in 1997). However, many facilities do not report data at this level of detail. Instead they report data on products and materials at a higher level of aggregation. Because several of the chemicals that are reported under the TRI are also 7-digit SIC categories (or 8-digit NAICS categories) on the materials and product trailers, we can evaluate whether facilities are better able to report detailed data to Census on their usage of these specific chemicals if they are required to track that data to comply with the TRI. We will also evaluate potential improvements in data reporting that could be obtained if the connections between TRI reported chemicals and Census product and materials categories are enhanced.

**The Impacts of the Clean Air Act Amendments on Economics Activity and
Environmental Quality: Evidence from Plant-Level Data**
Michael Greenstone, Massachusetts Institute of Technology

Over the last three decades, the federal government has attempted to balance the dual and often conflicting goals of promoting economic activity *and* environmental quality. The tension between these goals arises because regulations that reduce environmental degradation are likely to hamper economic progress. This project will examine one of the most important examples of such a tension – the federal government’s regulation of air pollution through the Clean Air Act. It will be the first comprehensive attempt to empirically estimate the direct costs and benefits of this regulatory program at the plant level.

The proposed project will exploit pollution categories established by the EPA. As directed by the 1970 Clean Air Act Amendments, the EPA established separate national ambient air quality standards (NAAQS) – a minimum level of air quality that all counties are required to meet – for six criteria pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter. As part of this legislation every county annually receives separate nonattainment or attainment designations for each of the six pollutants. The nonattainment designation is reserved for counties whose air contains concentrations of the relevant pollutant that exceed the federal standard. Emitters of the regulated pollutant in nonattainment counties are subject to greater regulatory oversight than emitters in attainment counties. Non-polluters are free from regulation in both categories of counties. This division of counties sets up an interesting quasi-experiment for measuring some of the direct effects of regulation. In principle, it is possible to identify these effects by comparing changes in outcomes in nonattainment and attainment counties.

An essential element of this project is the creation of a unique data file that contains plant-level information on pollution emissions and economic activity, as well as detailed measures of regulation. I have already created this file by linking the *Toxics Release Inventory (TRI)* and the *Annual Survey of Manufactures* (and the *Census of Manufactures*) for the years 1987 through 1997. The former contains plant-specific releases of more than 600 toxics into the environment, including whether the release was into the air, water, or ground. The latter provides information on plant-level employment, investment, shipments, and other characteristics (e.g., industry, age, and location). This plant-level file will be merged with one containing the annual, pollutant-specific, attainment/nonattainment designations. The application of this quasi-experiment to the above data file will provide estimates for a class of questions that cannot be posed with traditional public use files. I will estimate the effect of attainment/nonattainment status on pollution emissions, total employment, capital stock, and output. These results will be useful for many purposes. For instance, it will be possible to calculate the regulation-induced trade-off between environmental quality and employment; this trade-off has not been estimated previously but is central to any debate about environmental regulations. Additionally, I will fit plant-level production functions where pollution emissions are treated as an input. The nonattainment variables will serve as instruments for pollution emissions in these equations. The estimation of these equations will produce measures of the increased costs associated with mandated reductions in pollution. It will also be possible to gain insight into how firms adjust their production processes to comply with regulation. In summary, this project's results will provide an improved understanding of the costs and benefits of air pollution regulations and of how plants alter their production patterns to optimally comply with them.

The predominant purpose of this project is to benefit the Census Bureau's program and it will do so in at least three ways. First, in addition to linking the *TRI* to the *LRD*, this project will produce a cross-walk between the *LRD* PPNs and EPA establishment IDs. This will link the *LRD* to all plant-level EPA data sets. Thus, the project should be of great use for researchers interested in examining other aspects of pollution releases by manufacturing plants. Second, the project will produce estimates of the economic costs of environmental regulations and these estimates will serve as an important complement to cost estimates from the Census Bureau's *Survey of Pollution Abatement Costs and Expenditures (PACE)*. Third, this project's results may be helpful in identifying methods to refine the *PACE*'s questionnaire in order to elicit more valuable information.

Improving Data on Emissions and Voluntary Program Participation and Estimating Relationships among Participation, Emissions, and Other Plant Characteristics

Richard Morgenstern, Resources for the Future

Billy Pizer, Resources for the Future

Jhih-Shyang Shih, Resources for the Future

Collected under Title 13, Chapter 5, of the U.S. Code, the Census of Manufactures, Annual Survey of Manufactures, and Manufacturing Energy Consumption survey all contain important information about plant-level activity in the United States and associated material and energy use. Over the past decade, voluntary environmental programs have played an increasingly important role in environmental and energy management. Yet existing programs have been subject to only limited empirical study. An important question is whether participation in these programs is important enough to warrant inclusion in future surveys, analogous to current questions about energy management.

This project will increase the knowledge base of the Census Bureau and other researchers and analysts by merging existing data with additional information on emissions and voluntary program participation. First, this project will allow us to examine the impact of voluntary program participation and whether it warrants inclusion in future surveys. Second, the project improves our understanding of plant characteristics and activities while checking the quality of existing data. Third, the merged data sets will allow us to calculate population estimates of emissions and other measures of plant activity with and without the voluntary programs.

All three results promises important benefits for the Census Bureau in its effort to improve the

quality and usefulness of both existing Title 13, Chapter 5 data, as well as future survey instruments. Understanding how program participation interacts with other inputs and outputs can indicate whether participation indicators would be useful in future data collection. Comparisons with newly merged data sets allows for verification of some data elements. Even where direct comparisons are not possible, we can observe anomalies in indirect comparisons (for example, energy use and emissions) that signal a quality issue. As we compute population estimates of plant emissions and activity with and without voluntary programs, we will make use of state-of-the-art sample selection techniques. Such techniques, which are analogous to missing data techniques, could prove useful in other areas of work with Census data where population estimates are necessary despite significant problems with missing data. Finally, we expect this work to generate suggestions for improved survey design in the future. The last result will provide some of the first quantified estimates of voluntary program consequences involving careful attention to sample selection issues. Drawing on experience with EPA's 33/50 and Climate Wise programs, and DOE's 1605(b) program, the proposed research will identify program consequences based on competing sample selection approaches that jointly model voluntary program participation and emission outcome. The assumptions inherent in these competing models can alter or reverse estimated population effects. Comparing estimates across models and programs, we expect to draw conclusions that will be more robust and therefore more valuable for future decision-making.

Poverty, Welfare, and Employment

Welfare Reform and Migration: Moving to Benefits/Moving from Restrictions

Deborah R Graefe, Pennsylvania State University
Gordon F De Jong, Pennsylvania State University

Has devolution of welfare policy based on the 1996 welfare reform act created “welfare magnet” states where state policies provide more generous benefits and lenient participation requirements? Have welfare disincentive states with more restrictive policies resulted in increased intra-state adjustment moves and out-migration of welfare poor families? Does welfare-driven migration result in increased after-move well-being compared with before the move for welfare poor families versus non-migrant families?

This study uses merged data from four sources – the 1996 and 2001 panels of the survey of Income and Program Participation (SIPP), the Urban Institute's Welfare Rules Database, and a local labor market characteristics file created from decennial census and Current Population Survey data – in a longitudinal, two-stage specification of Welfare-benefit “push and pull” impacts on poor families' migration behavior. Based upon a state welfare policy inequality framework, we use factor analysis to develop measures from textual policy manual materials to operationalize 10 welfare benefit and eligibility rule dimensions for the post-1996 welfare reform implantation period and use these measures to test hypothesized state program effects on migration.

We use discrete-time event history analysis to predict migration events (inter-state or intra-state migration) in the SIPP data. Our hierarchical modeling strategy considers an integrated, and previously untested, micro-macro analysis of three determinant-of-migration hypotheses for welfare poor families. These test evaluate effects of 1) time-varying state welfare policy characteristics; 2) individual and family characteristics, including detailed migration, work, and welfare participation histories and network ties, from the information-rich SIPP files; and 3) local labor market-level economic opportunity structure indicators.

Following Frey et al. (1996), we separately analyze push and pull migration effects of our hypothesized co-variates through, first, a “destination model” for identifying pull effects, and then, a “departure model” which identifies push effects for potential migrant' origin locations. The combination of destination and departure model vectors for state welfare policy, local labor market, and individual

and household indicators will provide a strong test, giving new evidence on the 'salience of benefit variation to subjects' thesis (Shram and Voss 1999) regarding the welfare policy impact on migration. Finally, we model post-move family income, welfare benefits, and participation requirements as well-being outcomes of welfare poor migrants versus non-migrants using time-ordered additive and interactive OLS regression models.

The proposed work is expected to provide new estimates of migration among a significant portion of the U.S. population. The work is expected to: 1) provide estimates of migration among the welfare poor; 2) improve understanding the quality of data produced by the Census Bureau through efforts to understand migration-related reasons for loss to sample; 3) result in enhancement of the data collected by the Census Bureau by addition of state-level policy data and local labor market indicators for the 1996 through 2002 period, providing for the development of links across both time and entities for these data; and 4) demonstrate to the demographic community value of the SIPP for studying migration and other migration-related phenomena, since the Census Bureau has undertaken efforts with the most recent data collection to improve its quality for this purpose.

Using Matched California Administrative Data to Assess Impact of Welfare Reform on Immigrant Families and Quality of Census Survey Data

Henry E. Brady, University of California-Berkeley

This proposal is part of a larger three-year study of the impact of welfare reform on California's immigrant families that is funded by State of California through the University of California Public Policy Research Center, Welfare Policy Research Project. We propose to use the Survey of Income and Program Participation (SIPP) and Current Population Survey (CPS) linked to two major statewide administrative data sets in California, the Medi-Cal Eligibility Data System (MEDS) of the California Department of Health Services and Unemployment Insurance/Disability Insurance (hereafter referred to as EDD data) of the California Employment Development Department. The linkage of these data sets will produce longitudinal files for the California sub-sample of the CPS and SIPP with detailed information on immigration status and household characteristics combined with administrative data on public assistance program participation and earnings over time.

The proposed research will benefit the Census Bureau in a number of distinct ways. First, it will provide the Census Bureau with a basis to evaluate the accuracy of important self-reported measures in the Survey of Income and Program Participation (SIPP) and the Current Population Survey (CPS), including Medicaid coverage, receipt of cash aid, Food Stamps, and Supplemental Security Income (SSI). This validation will be valuable for the future use of these surveys because SIPP and CPS tend to differ significantly in their estimates of participation in these important programs. Second, comparing the SIPP and CPS data on program participation with the MEDS records will allow us to investigate differences between self-reports and administrative records for the 2 same individuals due to characteristics of the surveys, such as reference time periods and question wording, which are linked to the inaccuracies of survey respondents' self reports. Third, the match of EDD records with CPS and SIPP records will provide us with estimates of the direction and size of errors in reported earnings in the surveys. Fourth, this match will enable us to examine more closely the differences in poverty measures and rates using the CPS and SIPP by comparing the two surveys to administrative wage records and public assistance use. Fifth, using the administrative data we will evaluate the Survey of Population Dynamics (SPD) for its ability to track the use of welfare programs. Finally, the proposed match offers important insights on the residence and movements of immigrants and will contribute to improving the Demographic Analysis population projections.

Multi-year Measures of Income and Poverty

Jeffrey B. Liebman, Harvard University

This proposal requests that additional data be made available for an on-going research project. Under that project, "Reforming Tax and Transfer Programs to Assist Low-wage Workers," I have been

studying whether official Census measures of poverty, income, and the income distribution (and of the impact of government tax and transfer policies on these measures) can be improved by taking into account more than a single year's worth of income (potentially up to an individual's entire lifetime). For this work, I have been using a match of the Survey of Income and Program Participation (SIPP) to Social Security Administration's (SSA) data. I am requesting two additional sources of data. First, I would like to add additional years of the SSA data I have been using to link with the five SIPP panels that I have been working with, as well as for the 1996 panel. These updated data would make my analysis much more relevant to current rather than historic measures of economic well-being, and would allow me to present results for demographic groups such as black males with high school education that I cannot currently include due to the sample size rules that apply for disclosure analysis.

Second, I am requesting access to anonymized wage and firm identifier variables for the same years. The uncapped wage records in these data would allow me to construct lifetime inequality measures such as the spread between the 95th and 5th percentiles that are directly comparable to the standard annual ones. With the capped earnings data available in the data I have been using, I cannot study the upper quantiles where so much of the increase in annual income inequality has occurred. The anonymized firm identifier variable would be of significant value in analyzing measures of income inequality because it would allow me to include firm characteristics from the Census Business Register in my analysis and therefore to construct measures of job turnover, firm distress, and industry that would be critical for understanding changes in income and income inequality.

This project will benefit the Census Bureau in five ways. First, the predominant purpose of this study is to improve Census measures of poverty and income by incorporating multi-year measures. Second, in the process of conducting this research I will compare SIPP survey measures of earnings and Social Security benefits with administrative data on these same measures. Third, I will compare SIPP measures of earnings among workers with multiple jobs to administrative data on jobs for each individual. Fourth, I will compare the SIPP topical module on lifetime work history with administrative earnings data. Fifth, I will develop and evaluate a dynamic statistical model for imputing earnings levels above the Social Security taxable maximum that will be useful in constructing the "potential PIA" variable that the Census Bureau is planning to add to the SIPP.

The Impact of Welfare Reform on Female Headship Decisions: A Supplemental Data Request

John Fitzgerald, Bowdoin College

In the 1990s many states adopted reforms to the Aid to Families with Dependent Children (AFDC) program, the largest cash welfare program in the U.S. While much of the focus of these reforms has been on moving recipients from welfare to work, many reforms were also directed at affecting demographic decisions. Welfare reform hopes to reduce the incidence of non-marital fertility and encourage the formation and maintenance of two-parent families. Our ongoing project examines whether the reform provisions initiated as state waivers—and in some cases incorporated into the national legislation—deterred women from becoming and remaining unmarried mothers. Our specific aims in the project are to model female headship decisions (unmarried motherhood) and assess the impact of welfare reform provisions on those decisions while controlling for local economic conditions. So far, we have used data from the 1990,92,93 SIPP linked by respondent's residence to state policy variables and county labor market variables to estimate models of female headship and transitions into and out of female headship. We use confidential geography for county of residence to help separate labor market effects from state policy effects. Results to date indicate that waivers appear to have effects, but further work is needed to understand the mechanism at work. This proposal requests access to additional data to provide better longitudinal coverage and larger sample sizes for our analysis.

**An Evaluation of the Impact of the Social Security Disability Insurance Program
on Labor Force Participation during the 1990s**

Susan E. Chen, Duke University

This study will evaluate the impact of the Social Security Disability Insurance program (SSDI) on the labor force behavior of men. I will use two main approaches. First, I will follow Bound (1989) using a more current dataset, with more complete information on rejected SSDI applicants. This technique will produce a more precise upper bound on the elasticity of SSDI participation. Second, in addition to providing an upper bound, I will adopt a quasi-experimental approach to provide a point estimate of the impact for an important sub-sample of applicants: those whose eligibility is based in part on vocational factors. More specifically, with data on rejected as well as accepted SSDI applicants, I will be able to exploit the idiosyncracies of the Social Security Administration's Disability Determination Process. I will be able to show that the SSDI participation rule fits within a quasi-experimental design framework that has recently gained significant attention in the economics literature: the Regression Discontinuity Design. The data that will be used are the 1990-1996 panels of SIPP exact matched to the Social Security Disability Determination 831 file. Creation of this new dataset will enhance the reach of the SIPP data in three ways. First, by matching the SIPP to Social Security data, I will obtain a more accurate measure of SSDI participation than available in the SIPP. Second, I will be able to study the accuracy of and relationships between self-reported SSDI benefit receipt, health measures and disability status in the SIPP. And third, I will be able to compare the level of mis-reporting across all five panels of the SIPP.

Productivity Dynamics

Productivity, Location, and Growth in the Service and Manufacturing Sectors

Vernon Henderson, Brown University

This proposal has four interrelated parts, which use Census Bureau establishment level data for the manufacturing, headquarters, and business, professional, and financial service sectors. The first part that applies throughout examines the utility of these Census data by evaluating both their quality and their ability to characterize potentially important developments in these sectors. The other three parts deal with the specifics of the economic investigations using these data. What are these investigations?

Certain service and headquarters activities locate disproportionately in the largest metro areas, while manufacturing is found disproportionately in smaller towns and cities. Broadly defined business services have twice the share of employment in the largest metro areas as they do in the smallest cities, while for manufacturing it is the other way around. The question is why; and, hence, what is the role of large metro areas versus small and medium size cities in a country. To start to understand the forces at work, we need to examine at a micro level the local growth patterns, productivity, and outsourcing decisions in these industries. Urban agglomeration is determined primarily by two related forces. First are local scale externalities from information spillovers and labor market operations, whether internal to an industry or deriving from the overall scale of the local urban environment. Second are the benefits to local firms from local linkages in input and output markets. To what extent are headquarters in metro areas to take advantage of the diversity of local intermediate service inputs, as opposed to gather information about innovations, export markets, financing, and the like through local information spillovers from, say, other headquarters? Similarly, why are services located in the largest and most expensive metro areas? To what extent is it local scale externalities within the service sector, versus upstream and downstream linkages within the service sector, versus linkages to sectors using services (e.g., headquarters) where those sectors may experience high own-sector scale externalities?

The first two sections of the proposal examine these issues through a detailed analysis of city growth of headquarters and service industries, out-sourcing decisions, and productivity of headquarters and service sector firms. A variety of questions are explored econometrically. How does one identify scale externalities distinct from linkage effects, accounting for local market structure effects reflected in local price variation in output and input prices? How quickly do scale externality benefits drop off with distance from a plant to its sources of externalities? Such externalities are reflected in firm productivity. But where there is no direct output measure (headquarters), to what extent are these benefits reflected in wages versus rents? What is the role of firm structure and the relationship between operating units and their headquarters in determining out-sourcing decisions? The third section of the proposal looks at the determinants of industry mobility across cities. Are more concentrated industries less mobile, or is mobility driven by industry fundamentals such as capital and raw material intensity?

The fourth section of the proposal illustrates issues concerning the utility of the data that this work will examine in the course of data preparation and analysis. The proposal involves the use of the Longitudinal Research Data [LRD] for manufacturing, the Company Auxiliary Organization [CAO] and the Large Company Survey [ES-9100] for headquarters and firms, the Standard Statistical Establishment List [SSEL] and the time linked version of that [LBD] for service sector establishments, and the Assets and Expenditures Survey [AES] for service establishment material, service, and capital inputs (including computers). The CAO and ES-9100 have been rarely used in the past; the LBD has just been constructed to link establishments over time; and the AES has never been used by academic researchers. The project will benefit Census Bureau programs in understanding the quality of data produced through Census surveys, as well as identifying shortcomings of current data collection programs and documenting new data collection needs. The part of the project which employs location information (in the LRD, CAO, and AES) to examine plant location and mobility across geographic areas will help identify strengths and weaknesses of current geo-coding operations. It will reveal trends in industrial location that the Census Bureau should be aware of in its future collection activities. The service-outsourcing component of the project is the first systematic look at the importance of collecting (or not collecting) this kind of cost data. Expenditure questions for business services such as legal and accounting were only first asked in the 1992 ASM. The project will help understand if these costs are a significant proportion of total production costs for plants, headquarters and firms in the AES, CAO, ES-9100, and Annual Survey of Manufactures [ASM] and how such costs vary across service and manufacturing sectors of the economy. The analysis will reveal which categories of purchased services are most important items for data collection in different surveys. It will also reveal whether questions about out-sourcing in categories such as repair services are properly constructed or whether more questions about intrafirm relations and exchange of services would be helpful in either the CAO, ES-9100, or plant surveys.

The project will investigate headquarters and service industry survey responses that in general have been little explored by researchers and analysts beyond the basic Title 13 reporting activity conducted by Census. This work parallels the extensive expansion of the service sector surveys currently underway within the Census Economic Survey programs. Given how dynamic these sectors of the economy are, the analysis of this project will help provide important input to the evaluation and anticipation of the changes occurring in these sectors and their impact on survey execution. Opportunities can be uncovered for question clarification to improve the accuracy of the information reported by survey respondents. For example, does the AES include all the key pieces of information on the economic behavior of large service firms, are certain questions ill-designed to induce the desired correct response, or are some questions irrelevant? How useful for economic analyses are the individual industry Census of Services questionnaires and well do they integrate into the AES for analysis? The scope of the project includes many data sets. By linking the data sets together by firm, it is possible to identify the extent to which the establishments and firms match up over the surveys. Because each are the result of different survey processes, the linking will help clarify coverage of multi-establishment firms' activity and information gathered. Is there organizational complexity that is not currently being correctly captured by the surveys? Can we infer new information by combining the surveys? For example, is there additional detail on the functions of auxiliary establishments that can be uncovered using the industry classifications of other operating units in the same firm? Do outsourcing

expenditures for, say, legal services for establishments across the surveys add up to the totals reported for the firm? If not, can the differences be identified and understood? Are differences expected or problematic, and if so what can be done to improve coverage?

The Importance of Relocations in U.S. Manufacturing

Yoonsoo Lee, Federal Reserve Bank of Cleveland

A firm can grow over a sustained period of time by renewing itself through recurrent responses to various internal and external challenges. In the short run, a firm expands and contracts its activities and the number of workers it employs. Some radical changes in the environment, however, may lead a firm to shut down a plant and start over in a new location.

Because of this, competition among state and local governments to lure businesses has attracted considerable interest from economists, as well as legislators and decision-makers, regarding issues influencing relocation of a firm's manufacturing activities. While this process of relocation can cause dramatic shifts in activity and employment at the regional levels, as well as at the firm levels, very little is known about the actual patterns of relocation in the U.S. economy. Only a few previous studies have looked at how manufacturing firms geographically locate their production, and most of these have focused on either small manufacturing samples or small geographic regions. This project expands on this previous work by summarizing the patterns of plant relocation and the post-move performance of relocated plants using the full population of manufacturing establishments in the United States over the period 1963-1999 using non-publicly available plant and firm level data from the U.S. Census Longitudinal Research Database (LRD).

Focusing on an individual firm's decision to relocate, this project analyzes information on the relocation of a firm's manufacturing activities in the following three subprojects. First, this project assesses the relative importance of relocation across industries and regions by constructing industry level measures of entry, relocation, and exit. The study then examines whether relocation produces different patterns in plant openings and closings compared to *de novo* entry and permanent exit. Second, this project studies the characteristics of relocated plants along with their decision to relocate. Econometric model estimation will characterize how individual firms' geographic shifts of production processes are influenced by taxes, unionization, factor prices, ownership, and other geographic and plant specific characteristics. Third, this project investigates the impact of geographic shifts on a firm's post move production by comparing the growth rates of output and productivity for newly relocated plants to those of existing plants in the original location. The inverse growth-age relation suggested by Jovanovic's (1982) firm-learning model is tested for relocating plants to examine whether the inverse growth-age relation observed among young firms also holds for relocating plants that start over in a new space.

This project provides a number of benefits to the Census Bureau. These benefits include producing new statistics on the geographic movement of manufacturing activities at the *firm* level thereby suggesting a new way to expand the utility of the LRD in describing the geographic patterns of economic activities in the United States. Results of this research may also demonstrate the need for new measures of relocation to be incorporated in future surveys. Additionally by establishing links to the original plant of relocated plant, this research examines the consistency of geographic identifiers by potentially identifying previously undocumented coding problems and improves the understanding of regional linkages in the LRD. A better understanding of the dynamic geographic distribution of firm activity will help characterize the patterns of firm ownership that could be valuable for designing inquires on the Company organization survey that is an important Title 13 component of the Standard Statistical Establishment List.

**Prospects for Los Angeles In an Era of Globalization:
Structural Economic Change, and Employment Issues**

David L. Rigby, University of California

Allen J. Scott, University of California

In this research, we propose to investigate the impacts of globalization on the economy of Los Angeles and the wider region of Southern California. Our objective is to build analytical models of the interface between the local and the global economies in order to assess not just the immediate and most obvious impacts of globalization (such as changes in volume of trade and industrial specialization) but also to trace the indirect effects of globalization on the character and likely trajectory of local economic development. We plan to identify and to map the diverse weak and strong points of the local economy in relation to globalization processes, and to pinpoint their precise locations in Los Angeles' production system. Key industrial clusters will be identified, and the nature of their local and global linkages will be detailed. At the same time, we will look closely at the relationship between processes of globalization and the structure of local labor markets in Los Angeles. We intend to explore the local employment effects of globalization, first through analysis of changes in the supply and demand for workers with different skills, and second through investigation of the local labor market impacts of these changes on different segments of the population, especially African-Americans, Hispanics, women and immigrants. Labor markets across Southern California will be mapped in terms of their trade dependence.

Measuring Geographic Differences in Technical Change in the U.S. Manufacturing Sector

Ethan Lewis, Federal Reserve Bank of Philadelphia

Evidence on the use of personal computers strongly suggests that the adoption of new technologies has occurred at a much faster pace in some parts of the US than in others, and that this is causally influenced by the skills of the local work force. If technology use and implementation differs substantially by US region, it would be of interest to decision-makers and researchers to have statistics that document these regional differences. It would also be of value to the Census Bureau to have regionally representative micro data on the use of technology. This paper proposes to use the Surveys of Manufacturing Technology (1988, 1991, 1993) to generate a new publicly available aggregate data series: tabulated statistics representative of manufacturing employment and establishments by state and by major metropolitan area on the prevalence and reasons for use of advanced manufacturing technologies. In addition, two sets of sample weights which will allow future users of the SMT micro data to construct statistics that are representative of manufacturing establishments or employment in arbitrary U.S. regions (comprised of counties or states) will be constructed through a match to establishment universe data in the County Business Patterns county and state summary files (1988, 1991, 1993) and Censuses of Manufacturers (CM) (1987, 1992) by sample strata and region. Employment representative weights will also be constructed through a CM-SMT match by establishment id. The matches will also be used to investigate the geographic representativeness of the SMT, and a report with recommendations for the design of future technology surveys, including the possibility of geographic stratification, will be written. Developing new ways of presenting statistical data to the public, creating sample weights, verifying sample frame and documenting new data collection needs each constitute benefits to the Census Bureau under Title 13, Chapter 5.

In addition, the predominant purpose of this project is completed by a significant contribution to the Census Bureau's estimates of population characteristics under Title 13, Chapter 5, as follows. The project will use the regionally representative technology data to investigate the extent to which local work force skills affect technology use and worker productivity (wages). To do so, the prevalence of different technologies will be regressed on local work force characteristics as measured in public use

survey data (Censuses of Population and Current Population Surveys) across metropolitan areas. For the purpose of causal inference, instrumental variables regressions will be estimated using instruments for the skills of the local work force developed from the tendency of immigrants from different parts of the world to settle in particular US labor markets. In order to estimate the impact of any technological response on productivity, production functions that include particular technologies and local work force skills will be estimated. Manufacturers' reports of the benefits (e.g. improve product quality) and costs (e.g. costs of training workers) of technology will also be assessed as channels through which the skills of the local work force operate to affect technological change.

The Determinants of Industrial Location

Glenn Ellison, Massachusetts Institute of Technology

Edward L. Glaeser, Harvard University

This project proposal has two research goals. First, using the Longitudinal Research Database (LRD), we plan to revise our working paper NBER #6270 and CES-WP-98-3 we produced under a prior BRDC project. Second, we intend to investigate the impact of the change in industrial classification systems from the Standard Industrial Classification (SIC) to the North American Industrial Classification System (NAICS) from a spatial perspective. The NAICS represents a move forward in industrial classification from the SIC, but it is still difficult to appraise the geographic implications of this change in classification, both from the perspective of the longitudinal transition across years of Census of Manufacturers before and after 1997, as well as for what we know about the geographic distribution of economic activity. Does the geographic concentration of NAICS classified industries differ from that of comparable SIC classified industries, or are they very similar? By comparing locational measures for different industry classifications, we can begin to tell whether different classifications create different biases that Census planners and researchers need to be aware of. Finally, by looking at changes in industry classification for plants over time, we can check whether the NAICS system has led to more or less consistency in classification over time.

Local Labor Market Effects of Industrial Demand Shocks: Aircraft Manufacturing in the 1990s

Keenan More Dworak-Fisher, U.S. Bureau of Labor Statistics

John Bound, University of Michigan

In this study, we prepare estimates of population measuring the effects of local labor demand shocks on the labor market outcomes and geographic migration of U.S. workers. To do so, we generate a valuable new set of geographic delineations that are consistently defined across the 1990-2000 decade in 5 states. Within these delineations, we create estimates of how labor market and demographic characteristics of the resident populations changed over the decade. To generate our estimates of labor market behavior, we exploit a natural experiment in the aircraft manufacturing industry during the 1990s: a variety of plausibly exogenous factors that combined to severely diminish aircraft manufacturing in several localities, creating local labor demand shocks. Due to the end of the Cold War, a recession, and a glut in the commercial aircraft market, employment in this industry fell by 25 percent between 1989 and 1999, with the decline concentrated early in the decade. In a related development, the industry also restructured during this decade; consolidations borne out of a need to maintain minimum economies of scale caused some localities to be especially hard hit by the decline. At the same time, increased competition in the industry led to the increased adoption of lean production technologies that diminished employment in traditional aircraft manufacturing further. Because the aircraft manufacturing industry is so large, it comprises a significant proportion of employment in several areas where it experienced these severe declines. We generate our estimates of the labor market behavior populations by examining the changes of various population characteristics in these localities. We use our estimates of population characteristics within our newly defined geographic units to perform this analysis. We use data from the 1990 and 2000 Censuses of Population, including geographic detail, to construct indices measuring how wages, employment rates and population changed over the 1990s within narrowly defined geographic areas, while controlling for demographic

compositions of the areas. We match these indices up with measures of changes in overall job availability in the areas based on publicly available data from the Regional Economic Information System (REIS).

We use this linked database to estimate reduced form equations measuring the elasticities of wage, employment rate and population of various demographic groups and sectors to the labor demand shock caused by aircraft manufacturing's decline. In addition to benefiting the Census Bureau by preparing valuable estimates of population, this research will create a valuable intermediate product: a database of Census data that is linked across time through consistently defined geographic designations and linked with establishment based measures of employment. This database will provide a useful tool for the improvement of data quality via improved sensitivity checks for data review, additional inputs to imputation for nonresponse, and establishment-based checks on employment information by place-of-work that could be used in a benchmarking procedure. In addition, our research into creating geographic links and examining their use in the study of local labor markets will provide a valuable tool for evaluating the labor market designations created by the Census Bureau. The database will also provide an alternative starting point for future research involving geographic detail.

The Impact of Native American Casinos on Local Communities

William N. Evans, University of Maryland

In the late 1980s, a series of legal rulings favorable to tribes and the subsequent passage of the Indian Gaming Regulatory Act of 1988 legalized gaming operations on reservations in many states. Today, there are over 310 gaming operations run by more than 200 of the nations' 556 federally recognized tribes. Of these operations, about 220 are "Las Vegas" style casinos with slot machines and/or table games. By 1999, about half of tribal members in the lower 48 states are in tribes that run a casino-style gaming operation. By 2000, Indian-owned gaming operations generated about \$10 billion in revenues, about one-sixth of all revenues generated by legal gaming in this country. Given the large number of tribes that have embraced casino gaming as an economic development program, it is worth considering whether Indians on reservations have benefitted from these operations. As the legal and legislative controversies surrounding tribal-owned gaming persist, the interest in this question continues to grow. The authors of this proposal are currently involved in the first nationwide evaluation of the social and economic impact of Native American-owned gaming operations on tribes and their surrounding communities. Evans and Topoleski find that four years after tribes open casinos, employment increases by 26 percent, and tribal population increases by about 12 percent, resulting in an increase in employment to population ratios of five percentage points or about 12 percent. These benefits are not without costs. Their results indicate that although casinos improve aggregate employment in the counties where they are located, employment falls in surrounding counties. They also show that bankruptcy and crime rates increase in counties after a tribal-owned casino opens.

The investigators of this proposal outline a research program that uses restricted-use data from the 1990 and 2000 Census long-form samples to examine the impact of gambling on people who live on or near reservations. The long-form samples are sent to one in six households and contain a wealth of social, demographic, and economic information about households and their members. Public-use versions of this data do not contain enough geographic detail to place households in particular tribes or on reservations, but detailed geographic data are available on restricted-use versions of the data set, available for use at the Center for Economic Studies at the U.S. Census Bureau, a few miles from the University of Maryland Campus. Most of the tribal-owned gaming operations opened during the 1990s so the dates of the Census are fortuitous. One can examine the impact of a new casino by looking at changing economic outcomes for people that lived on or near reservations before and after the casino opened and compare these to changes for Census respondents whose tribes did not adopt gaming.

Residential Segregation

The Residential Segregation of Immigrant Groups in the United States, 1910-2000

David Cutler, Harvard University

Edward Glaeser, Harvard University

Jacob Vigdor, Duke University

The purpose of this research is to document the extent of immigrant segregation in U.S. metropolitan areas, explain the formation and dissipation of immigrant ghettos, and examine the implications of residential concentration for immigrants' socioeconomic and developmental well-being. The project will make use of public-use Census data to compute segregation indices and statistically analyze residential location choices and individual outcomes in 1910. The project will use non-public use Census microdata to perform statistical analysis in 1990, as well as 1980 and 2000 as the data become available.

This project will benefit the Census Bureau in two ways. First, the segregation data derived from this effort will complement the Bureau's own data on residential segregation, which to this point has focused on broad racial categories rather than individual immigrant groups. Second, learning about the dynamic evolution of immigrant enclaves will assist the Bureau in planning for future Census enumerations.

"Marrying Out" and Fitting In: Interracial Households, Residential Segregation and the Identity of Multiracial Children

Mark Ellis, University of Washington

Steven R. Holloway, University of Georgia

Richard Wright, Dartmouth College

We propose a three-year study of the residential choices of interracial partners to expand our understanding, empirically and theoretically, of multiraciality and interracial partnerships in American metropolitan areas. The basic questions we intend to address are as follows: Do interracial families live in segregated neighborhoods? Do they live in neighborhoods dominated by a particular race/ethnic group? Does this depend on the race of the male partner or the female partner? Do the social class positions of the partners affect the couple's residential choices? These initial steps in the investigation of the residential geography of interracial households set the stage for us to address a set of derivative questions associated with the permanence of ethnic and racial boundaries. In particular, what are the implications of the geography of residential choice for the childbearing decisions and the racial/ethnic identity of children of interracial couples?

To answer these questions we will make use of two data sets. The first contains detailed individual level information from a special version of the 1990 Census of Population and Housing. These data provide a one in six sample of individuals that permits us to study the residential location of interracial couples at the scale of the census tract. Simply stated, these data allow us analyze the residential location of interracial couples with previously unavailable geographical detail. The second data set is mortgage application information from the Home Mortgage Disclosure Act. These data record the race of single and joint applicants for home mortgages and the tract location of the property for which the loan is sought. We intend to merge these data for a number of years in the 1990s to analyze the residential preferences of interracial couples. The analysis will benefit the bureau in four ways: improvements in ethnic and racial imputation procedures; checking the validity of decennial data on interracial couples against an alternative federal data source; identifying tracts which should have high rates of multiracial reporting on Census 2000; and improving ethnic and racial population projections through better understanding of ethnic and racial identity formation of children of interracial couples.

Race, Ethnicity, and Residential Choice in Multilevel Perspective
Melissa C. Chiu, University of California- Los Angeles

This research seeks to use the Long form sample of the 1990 and 2000 Decennial Censuses to investigate residential choice patterns at two levels of geography, the labor market area and the neighborhood. Although the Census 2000 has not yet been released to the CCRDC, I can make substantial progress on the study using just the 1990 Census until the Census 2000 becomes available. The confidential data are necessary for this project because they include more detailed geographic information, county and Tract or Block Numbering Area (BNA), that is not available in the 1990 5% PUMS. In this study, I define labor market areas as groups of counties that have substantial commuting ties (Tolbert and Sizer, 1996). Neighborhood will be measured by Census Tract or BNA. In this dissertation, I study how individuals' decisions to stay or to move, and to where, are affected by racial, ethnic, and immigrant composition. The study will assess whether residential choice patterns are consistent with any of the following theoretical frameworks: (1) avoidance of racial outgroups, (2) preference for one's racial ingroup, i.e. own race, (3) economic avoidance of poor areas, (4) race and ethnicity based social capital, and (5) classic spatial assimilation, in which immigrant groups reside in more higher status areas as they gain socioeconomic status. I examine variations in choice patterns by racial group, ethnicity, and nativity status, as well as recent trends from 1985 to 2000, paying particular attention to intragenerational changes for immigrant cohorts. The study is especially interested in differences for labor market area versus neighborhood choice.

Statistical analysis will utilize a nested discrete choice model in which the top level consists of labor market areas and the bottom level consists of all neighborhoods within the chosen labor market area. The main geographic characteristics of interest are racial, ethnic, and immigrant composition, but the models will also control for economic conditions, such as unemployment and poverty rates, and area type, e.g. metropolitan or nonmetropolitan, and urban, suburban, or rural status. Individual level variables will include race, ethnicity, and nativity, human capital information, such as education and occupation, and demographic traits such as age and marital status. Spouse's demographic information will also be included if available.

This proposed project provides several benefits for the Census Bureau. First, I will document all coding errors and inconsistencies in the data within census year. Second, I will examine racial classification changes between 1990 and 2000 for spatial concentration and migration. Third, I will provide statistics for examining the change in migration question from five- to one- year migration. Fourth, I will assess tract population change and homogeneity over the 1990 and 2000 Censuses. Fifth, I will produce estimates of the population characteristics in the areas of spatial concentration and migration rates, by racial category. These benefits will assist the Census Bureau in understanding and improving the quality of its data, will provide a basis for improving methodology and data collection in the future, and will provide population estimates of interest to the Census Bureau.

How Does Space Matter in Ethnic Labor Market Segmentation? A Case Study of Chinese in the San Francisco CMSA

Qingfang Wang, University of Georgia

This study will examine the spatial influences on ethnic labor market segmentation, viz. how the locations of workers' residences and workplaces influence the emergence of ethnic niche occupations. It argues that human and social capital is built through particular spatial arrangements, and that residential and workplace locations can act to inhibit occupational choices. The study will use the confidential Census data derived from the Decennial Long Form 2000 to conduct a case study of Chinese in the San Francisco CMSA. The study has three objectives: (i) to examine the ethnic segmentation of San Francisco's labor market and identify Chinese niche sectors; (ii) to identify Chinese residential and workplace concentrations, and examine the social and economic characteristics of these concentrations; and (iii) to evaluate how the geography of home and work influences the emergence of Chinese occupational niches.

This project will contribute to the Census Bureau by improving the accuracy and reducing the costs of conducting the census. Three specific contributions can be mentioned. First, by identifying the many Chinese enclaves and examining the unique social and economic characteristics of each, the study will aid the preparation of estimates and characteristics of the Chinese population and minimize the problems of missed and inaccurately represented subpopulations during sampling. Second, this study will help the Census Bureau to design and appropriately target bilingual forms, provide telephone assistance and the telephone selfresponse options. By identifying and mapping *both* the residential locations and workplace locations of workers at census tract level, this study can facilitate the success of follow-up surveys and help reduce under/over counts. Finally, this study will help the Census Bureau in the development of a pilot study to over-sample the Asian population for Census 2010. For example, the results can be used to assess whether better estimates are to be gained from oversampling areas with high concentrations of the target (Chinese) population, or by over-sampling across a larger geographic area, albeit with smaller concentrations of the target population. The geographic patterns of Chinese concentrations can be correlated with patterns and rates of mail response to Census questionnaires to assess response rates. These benefits will help further the recommendations made by the Census Advisory Committee on the Asian Populations made as a result of the meeting on May 1, 2002.

Services Sectors

The Changing Structure of the Human Services Industry

David J. Tucker, University of Michigan
David Sommerfeld, University of Michigan

Historically responsibility for the provision of human services in the United States has been shared between public and private nonprofit forms of organization. This has changed substantially in the last thirty years with the increasing commercialization of the human services industry as evidenced by the increasing presence of for-profit organizations. While this change in the mix of organizational forms in this industry has resulted in a great deal of literature debating its nature, desirability and future implications, there has been little emphasis on testing arguments about how it occurred or empirically examining its effects. One important reason for this has been an absence of good quality longitudinal data. A second reason has been a tendency among researchers and analysts to emphasize description, prescription or evaluation in their studies, as opposed to explanation and the development of validated theoretical knowledge. Hence, using advanced forms of analysis to deepen theoretical understanding of factors contributing to this change and its effects has not been a central concern.

This research proposes to address these constraints first by working to obtain good longitudinal data by modifying the Longitudinal Business Database (LBD) and second, by using macro-level theories of organization to develop hypotheses about how this change occurred as well as about the nature of the processes underlying certain of its effects. First, on modifying the LBD, we propose to do this by linking with the Standard Statistical Establishment List (SSEL) and subsequently coding a variable from 1974 to the present for all 5 four digit industries in the 8300 SIC code classification (Social Services) that accurately differentiates establishments in these industries by legal form, i.e., whether or not they are tax-exempt. This not only will result in data appropriate for our research but also will produce significant benefits for the Census Bureau in the form of improved data quality and population estimates and, to a lesser degree, improved methodology.

Subsequent to improving the LBD, we propose to focus initially on two questions about changes in the 5 four digit industries in the 8300 (Social Services) SIC code. The first question concerns transformations in legal form, from tax-exempt (nonprofit) to taxable (for-profit) status, and inquires into the survival value to an establishment of changing its legal form from nonprofit to for-profit, or vice versa, i.e., does the risk of dying increase or decrease as a result of such transformations. The

second question concerns how variation over time in local environmental conditions affects the mix of legal forms of establishments in that environment by how it influences their rates of births and deaths. We anticipate that the answers to these questions will be of substantial interest to other researchers as well as to analysts, decision-makers and administrators.

Specialization and Organization in Legal Services

Luis Garicano, University of Chicago
Thomas Hubbard, University of Chicago

Since Adam Smith's famous 'pin factory' fable, economists have been preoccupied with the role that specialization and the division of labor play in economic growth. Surprisingly, however, this recognition of the fundamental impact that specialization plays in economic growth has not led to much systematic empirical work on the organization of specialization. In fact, no systematic empirical work has illuminated such questions as: When do individuals specialize and how does this relate to the complexity of activities? When do specialists work within the same firm, and when do they work in different firms? When is specialization limited by the extent of the market, and when and why is it limited by other factors such as coordination costs? What role do hierarchies play in facilitating specialization? What accounts for differences in hierarchical forms; for example, when do hierarchies tend to be steep versus flat?

Empirical evidence on these and other related questions is important for understanding a wide range of issues in industrial organization and labor economics. We propose to use microdata from the legal services portion of the Census of Services to investigate these and other related questions. These data contain firm-level information about the specialties of lawyers and the number of individuals who are partners, associate lawyers, paralegals, and non-legal staff. These data provide a unique opportunity to investigate specialization and hierarchies within professional service firms, and would allow us to study questions such as those described above in an ideal context.

Our project would provide a wide array of benefits to the Census Bureau. First, it would aid in understanding and improving the quality of Census of Services data. To our knowledge, no one at CES has worked with the Legal Services microdata. As we put the data into shape and conduct analysis, we will learn better the strengths and weaknesses of the data, which will allow Census staff to revise and improve the existing survey and indicate what other survey questions would generate good data about the organization and growth of this and other professional service industries. Second, it would potentially lead to a new or improved methodology to collect, measure, and tabulate data in professional service industries. Current definitions of the firm used by Census are based on the common ownership and control of physical assets; it is difficult to apply these definitions in contexts such as professional services, where physical assets are not necessarily important. By testing new theories of firms' boundaries that do not revolve around physical assets, we will examine whether new criteria for professional service firms' boundaries should be introduced. This is particularly important in light of the general movement away from manufacturing and toward services in the U.S. economy. Third, it would identify shortcomings of current data collection programs and document new data collection needs by providing evidence regarding the extent and incidence of temporary worker use in different segments of the legal services industry. This would help Census staff develop ways of accounting for such workers in this and other sectors by guiding it to the segments where they are most prevalent. Fourth, in the longer term, our project would be the first step toward enhancing Census' existing legal services data. It may be possible to create a matched worker-establishment database for this industry by merging the data from the Census of Services with that from the Martindale-Hubbell law directories.

Wages and the Organization of Human Capital: Legal Services, 1977-1997

Luis Garicano, University of Chicago
Thomas Hubbard, University of Chicago

The purpose of this proposal is to examine the quality of the 1977, 1982, 1987, 1992, and 1997 Census of Services data for legal services firms on payroll by occupation, to determine whether one can combine revenue and payroll data to infer partner compensation, and to assess whether the manner in which the Bureau collects the occupation and payroll data produces distorted estimates in its publications. We then plan to use the Census microdata to investigate how the organization of legal services – in particular, firms' hierarchical structure – has changed over time, characterize the distribution of wages in this industry and how it has changed over time, and analyze relationships between changes in hierarchies and changes in the wage distribution. The latter will lead to a better understanding of wage inequality not only in legal services, but in human-capital-intensive sectors (such as services) more broadly.

The project will benefit Census programs in several ways. First, the project centers around the payroll by occupation data, which to our knowledge have not been used by CES staff. In the course of our project, we will learn the strengths and weaknesses of these data and communicate them to Census staff. These data have the potential to be a valuable resource to researchers investigating wage inequality, but if the responses to current questions are low-quality, the questions should either be changed or discontinued. Second, the Census has published estimates of the number of partners and associate lawyers for the U.S. and for select MSAs in recent Census years except 1997. These estimates have been somewhat misleading because they are based on definitions of "partners" and "associates" that differ from conventional uses of these terms in the industry. We plan to assess the magnitude of the distortion this produces, and create alternative estimates that are based on conventional definitions of "partners" and "associates." Third, we would enhance the data we work with in two ways. We would link them over time, and provide alternative estimates of the number of partners and associates at each individual establishment in our data. These augmented datasets would be available to Census researchers.

The Impact of Minimum Quality Standards on Supply and Firms' Pursuit of Quality In the Child Care Industry

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Mo Xiao, University of California, Los Angeles

We propose to examine the impact of minimum quality standards on the supply side of the child care market, using a unique panel data set merged from the Census of Services Industries (1987-1997, establishments with payroll), state regulation Data (1987-1996), and accreditation data (1986-1997) from National Association of Education for Young Children (NAEYC). The welfare effect of minimum quality standards is theoretically controversial and empirically poorly documented due to data limitations.

The panel nature of this data set will make this study able to control state fixed effects and time fixed effects, in order to better answer: Will more stringent minimum quality standards reduce supply in the child care market? Will more stringent standards force more firms to exit the market? Will more stringent standards motivate firms to pursue higher quality via accreditation? This study will be the first in the field in the sense that it uses panel data to study the supply side of a market subject to minimum quality standards. This proposal will benefit the Census Bureau by incorporating external sources of data into the Census data, corroborating the Census data, providing estimates of the child care industry, and understanding industry dynamics.

Temporary Help Agencies and Local Market Conditions

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The Help Supply Industry (SIC 7363) has been one of the fastest growing industries in the U.S. economy. It includes both Temporary Help Services (THS) establishments, which supply workers to client firms on a temporary basis and Employee Leasing Services (ELS) establishments, which supply workers to client firms on a longer-term basis. Research on the industry has been growing because of the important role it is thought to have had in increasing labor market flexibility by efficiently matching workers and employers (e.g., Segal and Sullivan, 1995, 1997, Golden, 1996, Ono and Zelenev, 2003).

However, the rapid growth of the Help Supply Industry also presents challenges for statistical agencies and the researchers who use their data. One concern is that while the workers supplied by THS and ELS establishments are under the direct supervision of the client firm, they are on the payroll of the help supply establishments. Thus, they are not counted in the employment totals of the industries in which they perform their work. This can make standard estimates of labor productivity misleading for industries that utilize help supply workers. In addition, most research interest is in the role of THS firms in improving the functioning of labor markets, but most available data do not distinguish between THS and ELS employment. This is a concern because ELS firms, which typically take on the payroll of an existing workforce and have little role in the recruitment of workers, are unlikely to play the same important labor market intermediation role as THS firms.

This project will increase the Census Bureau's knowledge base about the relevant issues surrounding the Help Supply Industry. Given recent growth in this industry and its likely impact on the productivity and investment decisions of firms outside the industry (the client firms), this information is extremely important for evaluating Census's collection and tabulation of employment data. To examine these issues, this project will extend our previous work (Ono and Zelenev, 2003; Segal and Sullivan, 1995, 1997) with micro-level analyses of firms' use of temporary labor and the industrial organization of the THS industry. First, by using the 1997 and 2002 BES and PCU, we will analyze the extent to which THS usage buffers fluctuations in client firms' regular employment. We will also examine whether the use of THS is increased by greater competition among THS agencies. Next, by using the Census of Services and Longitudinal Business Database, we will study whether THS agencies are attracted to local markets with more volatile industrial structures, using the method employed in Ono and Zelenev (2003). We then will examine whether the entry of THS agencies reduces the markup they charge client firms for supplying workers. Finally, we will study the role of temporary help services in the particularly important market for temporary nurses.

This proposal will further benefit Census programs by using Census micro data to address data quality issues and to create documentation that will benefit the Census Bureau by increasing understanding of current problems in the data as well as by improving future data collection efforts. In particular, we will contribute to the development of methods to improve the separate estimation of the number of ELS and THS workers employed by each industry in each geographic area. This will require use of the Economic Census (EC) and the Business Expenditure Survey (BES). We will also develop methods to incorporate the inputs of THS and ELS workers in estimates of industry level labor productivity in manufacturing. This will require use of the Survey of Plant Capacity Utilization (PCU) as well as other census data sets.

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CES staff in bold.

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Michigan RDC

Working Papers

- Kurz, Christopher J., "Outstanding Outsourcers: A Firm and Plant-Level Analysis of Production Sharing." Working Paper, 2005.
- Senses, Mine Z., "The Effects of Outsourcing on the Elasticity of Labor Demand." Working Paper, 2005.

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Atrostic

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Foster

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Gray

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Klimek

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Kurz

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Miranda

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- Nguyen, Sang** and Ollinger, Michael. "The Impact of M&A on Employment, Wages and Plant Closing in U.S. Meat Product Industries." Presented at the American Agricultural Economic Association meetings, August 2003.

Nucci

- Davis, Stephen J.; Haltiwanger, John; **Jarmin, Ron; Krizan, C. J.; Miranda, Javier; Nucci, Alfred** and Sandusky, Kristin. "Measuring the Dynamics of Young and Small Businesses: Integrating the Employer and Nonemployer Universes." Presented at Annual Meeting, American Economic Association, Philadelphia PA, January 7-9, 2005.
- Donato, Katherine; Tolbert, Charles and **Nucci, Alfred.** "Changing Places, Changing Faces: What do Internal Census Data Tell Us about Immigrant Settlement in Nonmetropolitan U.S. Areas?" Presented at Russell Sage Foundation conference "Immigration to the United States: New Sources and Destinations" New York, NY, February 3-4, 2005.
- Donato, Katharine; Tolbert, Charles; **Nucci, Alfred** and Kawano, Yukio. "Changing Places, Changing Faces: What do Internal Census Data Tell us about Immigrant Settlement in Nonmetropolitan U.S. Areas?" Presented at Rural Sociological Society, annual meetings, Montreal, Canada, July 2003 and Southern Demographic Association, Annual Meetings, Hilton Head SC, October 14-16, 2004.
- Irwin, Michael D.; Blanchard, Troy; Tolbert, Charles; **Nucci, Alfred** and Lyson, Thomas A. "The Effect of Life Course Transitions on Mobility: Comparisons Between 1990 and 2000." Presented at Southern Demographic Association, Annual Meetings, Hilton Head SC, October 14-16, 2004.
- Nucci, Alfred.** "Population Change in New and Old Urban Areas." Presented at Southern Demographic Association, Annual Meetings, Hilton Head SC, October 14-16, 2004.
- Nucci, Alfred** and Boden, Richard. "Demography of Nonemployer Businesses -- Preliminary Evidence from the United States." Presented at the Comparative Analysis of Enterprise (micro) Data Conference, London, England, September 15-16, 2003.
- Nucci, Alfred** and Johnson, Kenneth M. "Population Change in Continuously Nonmetropolitan Territory – Evidence from Micropolitan and Other Nonmetropolitan Areas." Presented at Annual Meetings, Association of American Geographers (101), Denver CO, April 5-9,

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Reznek

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Riggs

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Zawacki

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2000		
Paper #	Title	Author(s)
02	The Impact of Ownership Changes: A View from Labor Markets	Robert H McGuckin Sang V Nguyen
03	Scale Economies and Consolidation in Hog Slaughter	James M MacDonald Michael E Ollinger
04	Differences in Job Growth and Persistence in Services and Manufacturing	Catherine Armington Zoltan Acs
05	Technological Change and Economies of Scale in U.S. Poultry Slaughter	Milton Madison James MacDonald Michael Ollinger
08	Plants and productivity in international trade	Andrew B Bernard Jonathan Eaton J. Bradford Jensen Samuel Kortum
06	The Impact of Vintage and Survival on Productivity: Evidence from Cohorts of U.S. Manufacturing Plants	J. Bradford Jensen Robert H McGuckin Kevin J Stiroh
09	The 1989 Change in the Definition of Capacity: A Plant-Level Perspective	Maura P Doyle
10	Measuring the Electronic Economy: Current Status and Next Steps	Barbara K Atrostic John Gates Ron Jarmin
12	An Option-Value Approach to Technology in U.S. Manufacturing: Evidence from Plant-Level Data	Adela Luque
11	County-Level Estimates of the Employment Prospects of Low-Skill Workers	David C Ribar
13	Technology Use and Worker Outcomes: Direct Evidence from Linked Employee-Employer Data	Adela Luque Javier Miranda
15	An Economist's Primer on Survey Samples	William J Carrington John L Eltinge Kristin McCue
16	Measuring Productivity Dynamics with Endogenous Choice of Technology and Capacity Utilization: An Application to Automobile Assembly	Johannes Van Biesebroeck

2001

Paper #	Title	Author(s)
01	Business Success: Factors Leading to Surviving and Closing Successfully	Brian Headd
02	Exporting and Productivity: The Importance of Reallocation	Andrew B Bernard J Bradford Jensen
03	Plant-Level Productivity and the Market Value of a Firm	Douglas W Dwyer
04	Who Dies? International Trade, Market Structure, and Industrial Restructuring	Andrew B Bernard J Bradford Jensen
05	Why Some Firms Export	J Bradford Jensen Andrew B Bernard
06	Market Structure and Productivity: A Concrete Example	Chad Syverson
07	Output Market Segmentation and Productivity	Chad Syverson
08	Plant Vintage, Technology, and Environmental Regulation	Wayne B Gray Ronald J Shadbegian
09	Entry, Expansion, and Intensity in the U.S. Export Boom, 1987-1992	Andrew B Bernard J Bradford Jensen
19	Civic Community in Small-Town America: How Civic Welfare is Influenced by Local Capitalism and Civic Engagement	Alfred R Nucci Thomas A Lyson Michael D Irwin Charles M Tolbert
10	The Life Cycles of Industrial Plants	Seong-Hoon Lee Michael Gort
11	U.S. Productivity and Electronic Processes in Manufacturing	B.K. Atrostic John Gates
12	Air Pollution Abatement Costs Under the Clean Air Act: Evidence from the PACE Survey	Randy Becker
13	Diversification Discount or Premium? New Evidence from BITS Establishment-Level Data	Belen Villalonga
14	The Utilization of Different Modes of Residence and Health Services by the Elderly	Kenneth A. Couch Alice Zawacki
15	Outsourcing Business Service and the Scope of Local Markets	Yukako Ono
16	The Demand for Human Capital: A Microeconomic Approach	Michael Gort Seong-Hoon Lee
17	Marshall's Scale Economies	Vernon Henderson
18	When Do Firms Shift Production Across States to Avoid Environmental Regulation?	Ronald J Shadbegian Wayne B Gray

2002		
Paper #	Title	Author(s)
02	The Role of Cities: Evidence From the Placement of Sales Offices	Thomas J Holmes
01	Computer Networks and U.S. Manufacturing Plant Productivity: New Evidence from the CNUS Data	B.K. Atrostic Sang V. Nguyen
04	How to Compete: The Impact of Workplace Practices and Information Technology on Productivity	Lisa M Lynch Sandra E Black
05	Beyond the Incidence of Training: Evidence from a National Employers Survey	Lisa M Lynch Sandra E Black
03	What's Driving the New Economy? The Benefits of Workplace Innovation	Sandra E Black Lisa M Lynch
07	Mergers and Acquisitions and Productivity in the U.S. Meat Products Industries: Evidence from the Micro Data	Sang V Nguyen Michael Ollinger
06	The Trend to Smaller Producers in Manufacturing in Canada and the U.S.	John R Baldwin Ron S Jarmin Jianmin Tang
09	Redistribution in the Current U.S. Social Security System	Jeffrey B Liebman
08	The Distributional Effects of an Investment-Based Social Security System	Martin Feldstein Jeffrey B Liebman
12	The Mis-Measurement of Permanent Earnings: New Evidence from Social Security Earnings Data	Bhashkar Mazumder
10	Estimating the Hidden Costs of Environmental Regulation	Satish Joshi Ranjani Krishnan Lester Lave
13	Parent-Child Bargaining, Parental Transfers, and the Postsecondary Education Decision	Charlene M Kalenkoski
11	Earnings Mobility in the US: A New Look at Intergenerational Inequality	Bhashkar Mazumder
14	IT Investment and Firm Performance in U.S. Retail Trade	Shawn D Klimek Ron S Jarmin Mark E Doms
16	Leaving Home: Modeling the Effect of Civic and Economic Structure on Individual Migration Patterns	Alfred Nucci Charles Tolbert Troy Blanchard Michael Irwin
15	The Deaths of Manufacturing Plants	J. Bradford Jensen Andrew B Bernard
17	The Longitudinal Business Database	Javier Miranda Ron S Jarmin
18	The Link Between Aggregate and Micro Productivity Growth: Evidence from Retail Trade	C.J. Krizan John Haltiwanger Lucia Foster
20	The Relationship of Personal and Neighborhood Characteristics to Immigrant Fertility	Laura E Hill Hans P Johnson

19	Interactions, Neighborhood Selection, and Housing Demand	Yannis M Ioannides Jeffrey E Zabel
21	The Measurement of Medicaid Coverage in the SIPP: Evidence from California, 1990-1996	David Card Andrew KG Hildreth Lara D Shore-Sheppard
22	Survival of the Best Fit: Competition from Low Wage Countries and the (Uneven) Growth of U.S. Manufacturing Plants	Andrew B Bernard J. Bradford Jensen Peter K Schott
23	The 1990 Decennial Employer-Employee Dataset	Kimberly Bayard Joel Elvery Judith Hellerstein David Neumark
24	Analysis of Young Small Firms That Have Closed: Delineating Successful from Unsuccessful Closures	Timothy Bates
25	The Survival of Industrial Plants	Michael Gort J. Bradford Jensen Seong-Hoon Lee
26	What Drives Racial Segregation? New Evidence Using Census Microdata	Patrick Bayer Robert McMillan Kim Rueben
27	Human Capital Spillovers in Manufacturing: Evidence from Plant-Level Production Functions	Enrico Moretti

2003		
Paper #	Title	Author(s)
02	Endogenous Growth and Entrepreneurial Activity in Cities	Zoltan J Acs Catherine Armington
01	An Equilibrium Model of Sorting in an Urban Housing Market: A Study of the Causes and Consequences of Residential Segregation	Patrick Bayer Robert McMillan Kim Rueben
03	The Impact of Welfare Waivers on Female Headship Decisions	David C Ribar John M Fitzgerald
04	The Impact of Minimum Wages on Job Training: An Empirical Exploration with Establishment Data	David Fairris Roberto Pedace
05	The Geographic Concentration of New Firm Formation and Human Capital: Evidence from the Cities	Zoltan J Acs Catherine Armington
06	Productivity, Investment in ICT and Market Experimentation: Micro Evidence from Germany and the U.S.	John Haltiwanger Ron Jarmin Thorsten Schank
07	The Role of Technological and Industrial Heterogeneity In Technology Diffusion: a Markovian Approach	Adela Luque
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