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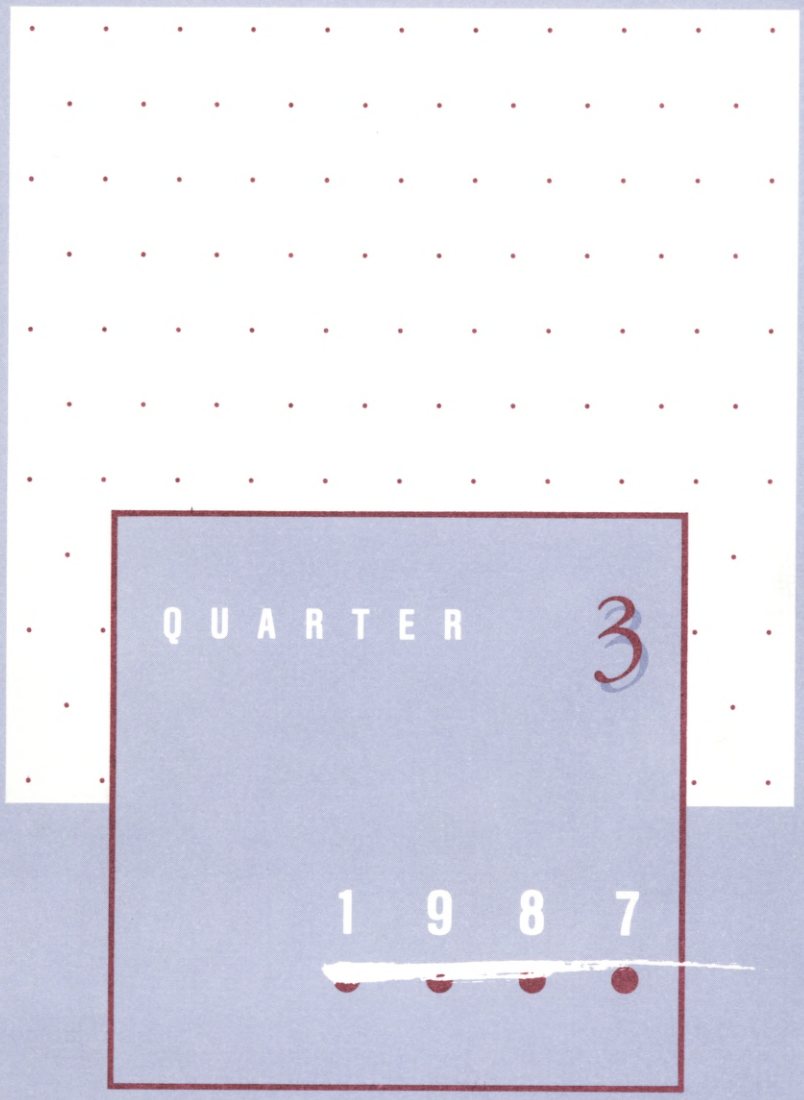

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Can Services Be a Source of Export-Led Growth? Evidence From the Fourth District

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Introduction

The U.S. labor market is currently undergoing dramatic structural change as service jobs rapidly replace manufacturing jobs. In 1960, manufacturing jobs clearly dominated the labor force, claiming 42 percent of total employment, compared with 11 percent for the service sector. Today, service-sector jobs (not including trade or transportation) claim 23 percent of employment, roughly the same percentage as manufacturing jobs.

The change in employment composition within cities in the Fourth Federal Reserve District is even more pronounced. As this trend continues both locally and nationally, it is important to know whether services can sustain an economy in the same way manufacturing has done. More specifically, can the service sector pull new dollars into the local economy by exporting services?

Interest in the exportability of services stems from the widely held view that the vigor of regional and national economies is linked to the health of their export sectors. Trade among regions of a country plays much the same role in regional health as does international trade in the growth of national economies. When viewed within this export-base model of regional growth, the relative decline of manufacturing employment raises several issues related to the prospects and process of future regional growth. Is the export base vanishing, reducing the potential for further regional growth? Are there other sectors that could be transformed into part of a regional export base?

This paper explores the exportability of services in order to address these questions. First, the service sector and exportation methods are described, particularly for those service industries most likely to be exported directly. Employment in service industries, particularly business services, is growing faster than employment in most other sectors of the economy, and faster in the Fourth District than in the U.S. Two possible explanations for this growth suggest that trade in services may increase: services may be exported directly to consumers out of the region, or they may be exported indirectly, embodied in exported manufactured goods. Differences in consumption of services among cities are not part of the export base, while direct exports are.

Service-sector export activity can be measured indirectly by estimating the variation across the U.S. in the relative concentration of service employment in local economies. Under various assumptions discussed below, large variations in the location quotients of a service activity across cities can be indicative of trade across areas. This technique allows identification of highly traded service industries and offers evidence of strengths and weaknesses in individual service industries in the four largest MSAs (metropolitan statistical areas) in the Fourth District: Cincinnati, Cleveland, Columbus, and Pittsburgh.

I. What Are Services and How and Why Are They Exported?

Kendrick (1986) states that "...the distinguishing characteristic of service-producing versus goods-producing industries is that service outputs are intangible and cannot be stored." Although this definition encompasses many more economic activities than those usually classified as services, it captures the essence of what services have in common. In the discussion that follows, the term "services" refers specifically to the aggregate of lodging places, personal services, business services, health services and hospitals, repair services, recreational services, legal services, educational services and schools, engineering services, accounting services, and social services. These comprise standard industrial classification (SIC) codes 70 through 89.

Some discussions of the service sector include many or all of the other industries that are commonly considered to comprise the "service-producing" sector: communication; utilities; finance, insurance, and real estate; wholesale and retail trade; and administration. This paper takes a narrower definition of services for two reasons. First, most of the growth in the service-producing sector of late has been in the narrower class of services, particularly in business services, which seem particularly amenable to export activity. Second, the data that were available for this study cover only this portion of the service sector.

This paper concentrates on professional and business services (also called the "producer" services), which together account for more than a third of employment in services. The professional services include legal, accounting, engineering, and educational services. Business services include services normally rendered to places of business rather than to final consumers, and comprise the following: advertising; services to buildings; computer and data processing services; management, consulting, and public relations services; equipment rental and leasing; credit reporting and collection agencies; direct mail advertising services; blueprinting and photocopying services; commercial photography, art, and graphics; stenographic and duplicating services; personnel supply agencies; and commercial research and development.

As is evident from this list, these activities often require a face-to-face meeting, or at least telephone contact, between supplier and consumer. In many cases they are done at the behest or on the premises of the consumer, so that the services are not storable. Although these features imply that services cannot be exported by the same means as manufactured goods (for example, shipping by rail or truck), they do not eliminate the possibility of service-sector exports. There are two ways to export services directly: activities may be transported and sold to persons outside the area, or individuals may travel to the area to purchase services. Sometimes consultants visit their clients; other times clients travel to consultants. Data is transmitted to programmers or to a distant mainframe computer. Construction equipment is transported to leasors.

Establishing the possibility that services may be transported addresses only one side of the issue: the necessary condition. The other side of the question is, why would they be traded? The export-base growth model, the simplest explanation for the existence of regional trade, is based on production economies of scale. If large-scale production reduces average production cost for some products, the minimum efficient scale (MES) may exceed the needs of the surrounding community. Then, welfare of all the communities will be maximized by specialization and trade among communities. Each community produces a subset of the products with scale economies, and this becomes their export base. The communities use proceeds from exports to import goods that are not produced locally. Regional growth is the result of expansion of the export base. Products with no economies of scale (that is, in which MES is small relative to local demand) are produced and consumed locally. The prevalence of interregional and international trade in manufactured goods is assumed to stem from larger MES in manufacturing than in service production.

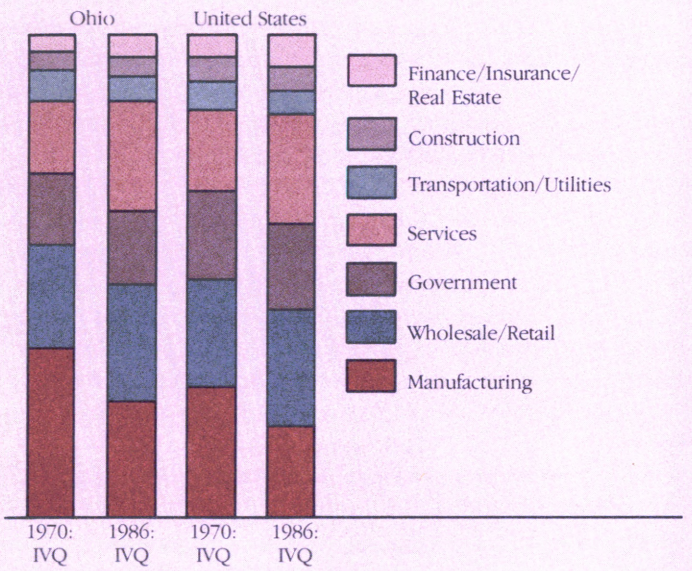
This export-base growth model is the source of the conventional view of the service-producing sector as one that grows only as a result of a healthy manufacturing sector and that does not generate "new" income for an area. The manufacturing sector, characterized by larger firms, generates income for the area through the sale of goods outside the region or country. Services, on the other hand, are provided by small local companies, and merely recycle within the local economy the income created by the manufacturing sector.

This perception of the service sector as dependent upon the manufacturing sector, however, has changed recently. To the extent that technological changes increase the MES of service provision, we can expect increases in service-sector trade. And, although they are not storable, services can be exported directly and consequently have the potential to spur local economic expansion. The question centers on the extent to which services are, and will be, traded relative to the manufacturing sector.

II. Changing Industrial Composition of Employment in the U.S. and Ohio

This section begins with a description of recent changes in the composition of employment in the United States and in the Fourth District, focusing particularly on employment growth in the services and their components. The rest of the section considers the reasons to expect growth in service-sector employment and to link growth with trade in services.

Industrial Composition of Employment in Ohio and the U.S.: 1970 and 1986



SOURCE: U.S. Bureau of Labor Statistics.

FIGURE 1

Figure 1 summarizes the changes in industrial composition of the work force in Ohio and in the nation. Overall, Ohio employment since 1970 has become more similar to that of the nation as a whole. Ohio entered the 1970s with only 15 percent of its employment in the service industries, compared to 17 percent for the U.S. By 1986, Ohio had almost matched the national figure of 23 percent of the labor force employed in the service industries. Since 1970, the number of jobs in U.S. service industries has doubled. In contrast, the manufacturing industries gained no jobs, so manufacturing's share of total U.S. employment fell from 28 to 19 percent. In the U.S. and in Ohio, the number of service jobs now almost equals or exceeds the number of manufacturing jobs.

But the relative growth of services in Ohio and in the major cities of the Fourth District followed a different pattern than in the U.S. At first, the region lagged behind national growth; now it appears to be catching up. Table 1 summarizes the pattern of growth of employment in the service industries in the U.S., in Ohio, and in the four largest cities of the Fourth District.

The relative growth of services in Ohio since 1970 came in two phases. Until 1983, shrinkage of manufacturing employment in Ohio, combined with modest (but below national-average) service growth, led to increases in the service industries' share of employment. However, since late 1983/early 1984, above-average growth in business services in Ohio has led to growth above the national average for the state's service industries as a whole. Even though the state's share of employment in the service industries now nearly matches that of the U.S., Ohio's 1986 rate of service-industry job creation of 7.1 percent continues to exceed the U.S. rate of 5.6 percent.

Because manufacturing was heavily concentrated in Ohio, the decline in manufacturing employment since 1970 was particularly dramatic here: employment share shrank from 37 to 24 percent. This resulted from the net elimination of almost a quarter of the state's manufacturing jobs and from the growth of other sectors, particularly the service industries.

Where is this recent growth taking place? Nationally, the two largest components of services are health services and business services, which together account for more than half of total service-industry employment. Health services supplied 38 percent of the growth in services until 1982. Since then, it has supplied only 17 percent of service-sector growth and has not increased its share of national employment. In contrast, business services contributed 22 percent of service growth until 1982 and 38 percent of growth since then. Thus, although health services were an important source of service growth through the 1970s and early 1980s, the mid-1980s have seen a rapid expansion of employment in business services.

Ohio has consistently kept pace with the growth of health services, maintaining an edge over the U.S. in percent employed in that industry. In contrast, throughout the 1970s and early 1980s, the state lagged the U.S. in the level and growth of business service employment, but now exceeds the national pace of expansion. In 1986, the growth of business services in the state was 13.1 percent, compared to 8.5 percent for the U.S.

Patterns of growth vary somewhat among MSAs within the Fourth District. Pittsburgh and Cleveland have the largest proportion of employment in the service sector. The strongest similarity among the four MSAs is the widening gap between their expansion in services and that of the U.S. (which includes rural areas) since 1984. Because services tend to be concentrated in urban areas, a city that only matches, instead of exceeds, the national average in service employment probably has a relative lack of services.

Summary of Service Employment Growth, 1970-1986

	Total Employment 1986[1]	% of Total 1986	Average Annual Growth Rate 1970-79	1980-84	1985	1986
United States						
Total	100,167	100.0	2.7	1.1	4.8	4.2
Manufacturing	19,186	19.2	1.0	-1.1	-0.2	0.2
Services	23,072	23.0	4.5	3.8	6.1	5.6
Health	6,586	6.6	5.6	3.8	3.5	4.4
Business	4,809	4.8	6.3	7.0	10.6	8.5
Ohio						
Total	4,475	100.0	1.6	-0.6	5.2	5.0
Manufacturing	1,109	24.8	-0.2	-2.8	0.0	-0.7
Services	999	22.3	4.0	2.2	6.4	7.1
Health	344	7.7	5.5	3.5	3.9	5.1
Business	192	4.3	n.a.	5.8	11.8	13.1
Cincinnati						
Total	651	100.0	2.0	0.0	6.5	6.2
Manufacturing	148	22.7	0.2	-2.7	3.5	0.1
Services	155	23.8	4.7	2.9	7.2	8.5
Health	49	7.5	n.a.	n.a.	1.7	4.6
Business	35	5.4	n.a.	n.a.	12.5	14.0
Cleveland						
Total	881	100.0	0.8	-1.2	4.0	4.3
Manufacturing	206	23.4	-0.8	-4.3	-1.7	-0.7
Services	224	25.4	3.2	0.9	6.5	7.0
Health	72	8.2	n.a.	n.a.	5.0	6.1
Business	50	5.7	n.a.	n.a.	13.9	8.9
Columbus						
Total	630	100.0	2.6	0.7	7.3	6.7
Manufacturing	106	16.8	0.2	-1.8	1.3	-0.1
Services	146	23.2	5.5	4.1	7.7	9.3
Health	38	6.0	n.a.	n.a.	6.3	5.1
Business	32	5.1	n.a.	n.a.	7.9	15.3
Pittsburgh						
Total	842	100.0	n.a.	-1.9	3.5	3.3
Manufacturing	129	15.3	n.a.	-8.1	-4.8	-6.7
Services	253	30.0	n.a.	3.6	4.7	4.5
Health	80	9.5	n.a.	3.5	4.1	2.7
Business	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

1. In thousands.
n.a.: not available.
SOURCE: Bureau of Labor Statistics Employment and Earnings Reports.

TABLE 1

In the four largest MSAs in the District, business service growth has risen sharply since 1984. In 1983, the proportion of people employed in business services in Cincinnati, Cleveland, and Columbus almost equaled the national average. As of the end of 1986, all three cities had 18 to 20 percent more employees than the national average in this sector.

This recent growth in the service industries (particularly in business services) has been dramatic, and service employment growth can be expected to continue to exceed manufacturing growth for four reasons: increasing affluence, increased standardization, lower delivery costs, and technological changes that raise the relative cost of small-scale internal provision.

In general, employment growth in manufacturing has been limited by rapid productivity increases, not by decline in demand for its output. Measured in terms of its share of gross national product (GNP), manufacturing has not shrunk. This has meant greater affluence for consumers, who have spent an increasing portion of

their wealth on services due to a high income elasticity of demand for services. Consumers who are already affluent tend to spend disproportionately more of further increases in income on the purchase of services, rather than on agricultural products or manufactured goods. Beeson and Bryan (1986) argue that just as increasing productivity in nonmanufactured goods (for example, agriculture) in the early twentieth century was associated with a shift toward manufacturing in consumption and employment, so an increase in manufacturing productivity now leads to the service boom. The growth of services is a sign of our increased affluence.

Certainly, the growth of health and personal services fits the pattern of increased affluence, but how does this explain the expansion of business services? Affluence may have shifted consumption toward final products whose component industries tend to use business services most. For instance, an increasingly litigious society needs more legal photocopy shops for its attorneys. Or, increased demand for differentiated or luxury goods will raise demand for advertising services, because luxuries and differentiated products are advertised more heavily than are essentials or standardized goods. While this explanation predicts growth in the service sector, it does not predict increases in service-sector trade.

The other three explanations for growth (standardization, falling delivery costs, and technological change) have implications for trade because they suggest that the production of services is now increasingly subject to economies of scale. That is, larger size may now enhance efficiency in service provision.

First, management and other technologies have become specialized and routinized to the extent that there are new economies of scale in consolidating them across company lines. Stanback, et al. (1981) suggest that increased specialization found in large firms leads to routinization of functions. Once routine, these functions can be separated from other functions of management. Firms with consistent demand for the service may still provide it internally. Firms with intermittent demand will purchase the service as needed from vendors who specialize in its routine provision.

To accelerate the process, information, transportation, and communication have become less costly, reducing the necessity for essential components of management to be located near the scene of production, either geographically or within the same firm.

Furthermore, technological changes may have raised the relative cost of providing intermittent or small amounts of services internally. Business services provide a way to purchase some portion of the services of an indivisible technology, or to meet peak loads (for example, due to seasonal, cyclical, or unanticipated demand growth). The complexity or the larger efficient scale of new products used by businesses could make it more economical to contract out for services rather than provide them internally, especially for small establishments. Examples are the use of external computer time-sharing, data processing, and photocopying services, as well as the use of temporary personnel.

Taken together, these three points suggest that net costs to separation of components of management and production processes have fallen; that is, scale economies have risen in business service provision. This may explain why between 1975 and 1984 (according to County Business Pattern Data), large (more than 100 employees) establishments' share of employment in business services rose from 44 to 49 percent. In addition, the Census of Services notes that the percentage of business service establishments that were part of firms with three or more establishments rose from 4.7 in 1972 to 11.4 in 1982. An increase in the MES of service provision makes services more similar to manufacturing. In particular, it makes trade more likely.

Business service growth comprises two elements: growth of employment because of increased production of services, and increased outsourcing of services formerly provided internally (that is, transfer of employment to service firms). During 1975 to 1984, while the size of business service establishments grew, large manufacturing establishments decreased their employment share from 74 to 63 percent, and the average size of manufacturing establishments shrank from 60 to 55 employees. The decline in the average size of manufacturing establishments should increase demand for business services; of course, outsourcing of business services may also be a source of the decline.

Growth resulting from increased demand for business services could be due to the increased affluence previously mentioned, or to increased productivity of services (assuming a highly price-sensitive demand). Unfortunately, the intangible nature of services makes it difficult to measure productivity of these industries. Service output (work performed) is difficult to distinguish from input (person-hours). Thus, usual attempts to measure productivity changes have detected only small or negative improvements in the service sector. However, the purchasers of services provide a clue to the direction of changes in productivity. If management acts to maximize profits, their purchase of a service (as opposed to internal provision) indicates that they consider the purchase to be the least-cost alternative. It follows, then, that increasing demand may

be the strongest available evidence of increasing productivity in business services.

The strength of service-sector employment growth in the Fourth District may be due to catch-up growth of locally consumed services or to establishment of service exports to nonlocal consumers. Although growth is encouraging for the region in either case, only growth due to exports adds to the economic base of the region.

III. The Regional Economic Base and Measurement of Service Export Activity

Three explanations for service-sector growth suggest that many services may be increasingly exportable from one location to another. Thus, a region (or city or country) could become a service exporter as part of its economic base. Export activity may be direct (sales of services across boundaries) or indirect (sales of goods containing embodied services across boundaries). Because of the regional specialization of economic activity, and because business services are purchased primarily as intermediate goods, differences in local production of business services are related to differences in the regional concentration of other industries, as well as to direct export activity.

If a region's export industries are intensive users of services, that region indirectly exports services. But these are exports consistent with the old view of services as a secondary, supporting sector, rather than as an independent part of the economic base. Services that are primarily exported indirectly do not attract "new" dollars into the region directly, unless they attract other producers by making the region more competitive. This is one reason for the concern that services are not a viable part of an economic export base for a region (see, for example, Cohen and Zysman [1987] and Perna [1987]). For policy purposes, identification of potential indirect exports may be less relevant than identification of direct exports.

Alternatively, expansion in the market for business services outside the firm implies the potential both for nonlocal provision of services, and for incentives for the formation of direct service-exporting companies. In this case, services are clearly part of the economic base of the area.

Services may be traded across city, regional, or national boundaries. In 1981, the United States was a net exporter of business services. The growing importance of international trade in services has been recognized by the Conference Board, which recently issued a report emphasizing the need for lower import restrictions for services among our trade partners (Basche [1986]).

Keil and Mack (1986) suggest that a useful measure of the export potential of an industry is the extent to which employment share (relative to the national average) varies among cities. Local employment share divided by national share is called the location quotient. In their framework, if location quotients for an industry vary strongly among cities, the cities with larger shares are probably exporting that industry to cities (or, perhaps, countries) with smaller quotients. Cities use the proceeds to purchase the products of industries in which they have low location quotients.

If export activity is heavy in an industry, one would expect to see many cities with very little employment in the industry, and others with heavy concentrations of jobs in the industry. If little export activity occurs, all cities will have about the same percentage of employment in the industry. Thus, a service industry with a high variance of location quotients across areas is likely to be an industry with trade activity and, therefore, export potential. Of course, the products of such an industry are also likely to be imported (and, thus, to be a source of dollar outflow) for many cities.

Exports per capita (based on size of the city's labor force) of industry i in city j (X_{ij}) are defined as quantity produced (Q_{ij}), minus local consumption (C_{ij}), all in per capita terms:

$$(1) \quad X_{ij} = Q_{ij} - C_{ij}.$$

Keil and Mack measure Q_{ij} by employment in industry i as a proportion of total employment in city j divided by the industry average employment share across the nation's cities. This is defined as the location quotient for industry i in city j (L_{ij}). Two assumptions are made. First, labor productivity is constant across cities and industries (that is, $Q_{ij}/L_{ij} = Q/L$, for all i, j). Second, all consumption patterns are constant across cities (that is, $C_{ij} = C_i$, for all j), so:

$$(2) \quad X_{ij} = L_{ij} \cdot (Q/L) - C_i.$$

Under these assumptions, we can take the sample variance of each side for each industry i as follows:

$$(3) \quad s_i^2(X_{ij}) = (Q/L)^2 \cdot s_i^2(L_{ij}).$$

If industry i is characterized by a high trade volume, some cities thus will have high imports ($X_{ij} << 0$) and others will have high exports ($X_{ij} >> 0$). Therefore, the variance of the X_{ij}'s for industry i across cities will be high. On the other hand, if little of an industry's product is traded, all X_{ij}'s will be of similar size, so their variance across cities will be small for the industry.

If the two assumptions of identical productivity and consumption patterns across regions hold, variation in the relative size of the labor force in industries across cities is directly

Business Service Industry Consumption in 1981

Disposition of Total Receipts	All Industries	Business Services
Intermediate demand	47.6%	82.0%
Final demand	52.4	18.0
Personal consumption	32.8	8.6
Inventory and investment	8.9	0.0
Net exports	0.6	1.5
Government purchases	10.1	7.8
Total	100.0%	100.0%

Industry	Share of Final Demand	Share of of all Industries Total Output[1]	Share of Business Services Intermediate Output[2]	Relative Use of Business Services[3]
Oil, mining, agriculture, ordnance and forestry	0.6	7.3	1.8	0.3
Construction	11.8	7.4	15.3	2.1*
Nondurable manufacturing	15.3	19.3	14.0	0.7
Durable manufacturing	15.6	16.7	10.3	0.6
Transportation	3.0	3.6	2.9	0.8
Communication	1.6	1.6	1.5	0.9
Utilities	2.8	4.2	0.7	0.2
Wholesale and retail trade	15.1	11.0	21.9	2.0*
Finance and insurance	3.9	3.8	7.0	1.8*
Real estate	11.3	8.8	3.8	0.5
Hotels, personal and repair services	1.9	1.3	1.5	1.2
Business services	1.9	5.3	8.1	1.5
Eating and drinking places	3.8	2.5	2.2	0.9
Automobile and recreation services	5.1	2.0	2.3	1.2
Health and professional services	9.8	5.1	5.9	1.2
Government enterprises	0.4	0.5	0.6	1.2
Total	100.0	100.0	100.0	

1. Total measured output by enterprises in each industry, including double counting due to use of output as intermediate goods by other enterprises.
2. Total consumption of business services as an intermediate good by each industry.
3. This is the number in the third column divided by the number in the second column. Numbers over 1.0 indicate greater-than-average use of business services as an intermediate good; numbers below 1.0 indicate less-than-average use of business services.
*Industry with relative use greater than 1.7.
SOURCE: Planting, Mark A., "Input-Output Accounts of the U.S. Economy, 1981," *Survey of Current Business*, vol. 67, no. 1, January 1987.

TABLE 2

related to variation in trade activity among cities for that industry. If the two assumptions do not hold, the variations in the location quotients may not be detecting trade activity. The remainder of this section and the next section explore the plausibility of these assumptions.

Differences in the relative cost of local factors of production can lead to differences in location quotients among areas. Because of cost-minimizing substitution among inputs by service providers, such differences cause variation in the labor input even if quantity produced does not vary. Conversely, if labor is more productive in one industry than in another, variation in employment will understate the relative value of exports in the more productive industry. (However, to the extent that the focus of the exercise is to identify employment creation by export activity, this bias is appropriate.) A related problem arises if there are systematic biases in the way labor input is measured. For example, industries with more variation in their use of part-time labor may appear to have more export activity by this measure than one where the full-time/part-time ratio is consistent among most employers.

It is difficult to account for regional differences in service-sector productivity, because service-sector output is not available. National level estimates use income accounts, which are not available for regions. As a first attempt to check the plausibility of the equal productivity assumption, the results that follow (based on employment) were compared to calculations based on variation in receipts. Differences were negligible.

IV. Differences in Consumption of Services Among Areas

Differences in regional concentration of services may be related to consumption patterns of cities' residents and businesses, rather than to direct export activity. Most variations in personal services location quotients are probably due to variation in city residents' consumption. For example, regional differences in the taste for hairdressing or in climate could generate nonexport-based variations in location quotients. For this reason, the analysis below excludes personal services.

Controlling for variation due to indirect exports (differences in consumption by cities' businesses) is more problematic. The technique applied below does not distinguish between direct and indirect export activity. However, if the users of services are regionally dispersed, indirect exports are likely to be a smaller portion of total exports than if the users tend to be concentrated geographically.

Table 2 presents national consumption patterns for business services in 1981, the latest year available. The upper panel compares the disposition of total output, as measured by receipts, of all domestic industries to that of business services. On average, about half (47.6 percent) of the output of U.S. firms is purchased by other firms as an input to their own production. The other half is produced for final demand, primarily personal consumption (about 33 percent of the total) and government purchases (10.1 percent of the total). Investment and inventory changes consume another 8.9 percent, while net exports were less than 1 percent of total output.

The pattern for business services is markedly different. Intermediate demand consumes 82.0 percent of total output, with the remainder fairly evenly split between personal consumption and the government. In short, the demand for business services is indeed primarily a derived demand from that for other industries. Thus, variation in the level of personal consumption is not likely to be a significant source of variation in the provision of business services. It is also interesting to note that the U.S. balance of trade in business services, although small (only 1.5 percent of business service output), is better than the average for U.S. industries.

The second panel of table 2 indicates which industries are the largest consumers of business services. Two factors are important in the level of consumption: the relative size of the consuming industry and its relative use of business services. The first column of the table compares industries by their share of output consumed as final demand. The second column shows each industry's share of total output, which includes products sold to other firms as intermediate goods. The third column lists the share of the total output of business services consumed by each industry.

Four industries emerge as heavy (double-digit) users of business services: wholesale and retail trade; construction; durable manufacturing; and nondurable manufacturing. The trade industries alone use almost 22 percent of the output of business services, not only because the sector is large, but also because the industries have a high relative use of these services. Construction also combines the influences of large industry and heavy use. In contrast, manufacturing firms are below-average users of business services. However, because of the size of the sector, they consume 24 percent of the output of business service firms.

Of the four largest consumers of business services, the top two (construction and trade) are very regionally dispersed, one is somewhat dispersed (nondurable manufacturing), and one is fairly concentrated (durable manufacturing). Construction and wholesale and retail trade have two features in common: seasonal demand and small establishment sizes. Their prominence is consistent with the hypothesis that business services provide smoothing and scale economies to their customers. Thus, by this cursory analysis, the evidence is somewhat mixed. Some of the regional variation in service employment no doubt derives from regional variation in manufacturing consumption. Nevertheless, much of the regional concentration of services is probably due to direct exports, and therefore is a viable part of an economic export base.

V. Signs of Service Export Activity by Industry

Which service industries are characterized by the most trade activity? Unfortunately, statistics on the service sector are not plentiful. However, in 1982 the U.S. Department of Commerce conducted an economic census of the service sector. From that snapshot of services in the U.S. and in Fourth District cities, we can get some indication of our service industry strengths and weaknesses. Because much of the most interesting growth in services took place after 1982, the conclusions we can reach about current strengths and export activity from these data are at best limited. The data allow identification of the baseline distribution of industries. However, it is not clear whether subsequent growth took place in those industries the region lacked or in those industries showing relative strength.

Table 3 ranks three- and four-digit hotel and producer service industries by the standard deviation of employment location quotients across MSAs in 1982. The data used are employment totals in taxable (that is, for-profit)

Service Industry Export Activity Among MSAs in 1982

Service Industry	Percent of Total Employment[1]	Export Activity Group[2]	Standard Deviation of Location Quotients
Research and development laboratories	0.06	High	0.192
Schools and educational services, not elsewhere classified	0.02	High	0.161
Hotels, motels, and lodging places	1.26	M-High	0.106
Direct mail advertising services	0.06	M-High	0.100
Surveying services	0.03	Moderate	0.076
Interior designing	0.02	Moderate	0.075
Engineering services	0.61	Moderate	0.074
Testing laboratories and facilities	0.04	Moderate	0.073
Commercial photography, art and graphics	0.08	Moderate	0.071
Correspondence and vocational schools	0.05	Moderate	0.066
Stenographic and reproduction services	0.03	Moderate	0.065
Commercial sports and recreation	0.53	Moderate	0.063
Blueprinting and photocopying	0.03	Moderate	0.061
Photographic finishing labs	0.09	Moderate	0.059
Advertising services	0.23	Moderate	0.056
Computer and data processing services	0.55	Moderate	0.056
Equipment rental and leasing services	0.19	Moderate	0.054
Architectural services	0.14	Moderate	0.052
Management and public relations consulting	0.55	M-Low	0.045
Personnel supply services	0.86	M-Low	0.042
Credit reporting and collection agencies	0.08	M-Low	0.038
Detective agencies and protection services	0.47	Low	0.031
Other repair shops and related services	0.25	Low	0.028
Legal services	0.83	Low	0.028
Services to dwellings and other buildings	0.81	Low	0.026
Electrical and electronic repair shops	0.13	Low	0.023
Accounting, audit, and bookkeeping services	0.47	Low	0.018

1. Industry employment as a percent of total employment in all industries in all U.S. MSAs.
2. Export activity group is a somewhat arbitrary grouping of the industries on the basis of standard deviation of the location quotients in that industry across all U.S. MSAs (shown in the last two columns). The following service industries were excluded from this analysis: trailering parks and camps; all health services; bowling alleys and billiards and pool establishments; telephone answering services; other services; photographic portrait studios; funeral services and crematories; automotive services; automobile parking; all personal services; reupholstery and furniture repair; other health services; other business services, not elsewhere classified; auto rental and leasing without drivers.

SOURCES: U.S. Department of Commerce, Census of Service Industries 1982 (service industry employment by city); Department of Commerce County Business Patterns 1982 (total employment by city).

TABLE 3

establishments by industry and MSA from the 1982 U.S. Department of Commerce Census of Services. Personal services are excluded from the analysis because variations are probably due primarily to variations in demographic characteristics. Health services are excluded because these data omit the tax-exempt sector and hospitals, which are both important employers in health services.

The industries are grouped from high evidence of export activity to low export activity, based on the standard deviation of location quotients for the industry. At the top of the list are research and development laboratories and private technical schools, reflecting the inherent exportability of knowledge (although the variation in research and development employment may be due to indirect exports). The large variance in employment by hotels, motels, and other lodging places among MSAs reflects the variation in the extent of tourism and convention activity among cities. On the other hand, at the bottom of the list are legal services and accounting, audit, and bookkeeping services. Most of the output of these two industries is probably consumed locally.

For comparison, table 4 presents standard deviations for two-digit manufacturing industries. The higher level of aggregation in these data should tend to reduce variation. Nevertheless, the standard deviations of location quotients among MSAs of these industries are, in general, higher than those of the service industries. Application of the same export activity groupings used in table 3 puts more than half (10 of 19) of the manufacturing industries in the high

or moderately high categories, compared to four of the 27 service industries included. There is, however, considerable overlap in the ranges covered by the standard deviations in services and manufacturing.

For example, three service industries (R&D labs, schools not elsewhere classified, and hotels) show more evidence of export activity to other regions than does primary metals. Thus, while the more traditional view of manufacturing as inherently export industries and services as inherently local industries has some validity, a subset of service industries is at least as geographically concentrated as the bulk of manufacturing industries.

The pattern of export activity across MSAs in the District shows no strong consistency, except perhaps for the lack of concentration in the most heavily traded industries. Each city has a unique pattern of strengths, which is to be expected if the proximity of cities increases the probability that they trade heavily with one another. Cleveland's concentration in private, for-profit schools and educational services, not elsewhere classified, is the only entry from the high or moderately high exportability groups. A few industries appear more than once. For instance, personnel supply services is prominent in three of the four cities. Management and public relations consulting; detective and protection agencies; and accounting, audit, and bookkeeping services each appear twice. These are the only cases of repetition.

Manufacturing Industry Export Activity Among MSAs in 1982

Manufacturing Industry (SIC)	Percent of Total Employment[1]	Export Activity Group[2]	Standard Deviation of Location Quotients
Petroleum and coal (29)	0.12	High	0.250
Textile mill products (22)	0.53	High	0.237
Leather and leather products (31)	0.15	High	0.213
Furniture and fixtures (25)	0.36	High	0.151
Lumber and wood products (24)	0.29	High	0.145
Instruments and related products (38)	0.75	High	0.131
Primary metals (33)	0.85	M-High	0.105
Miscellaneous manufacturing (39)	0.42	M-High	0.101
Paper and allied products (26)	0.56	M-High	0.094
Transportation equipment (37)	1.43	M-High	0.088
Apparel and other textile products (23)	1.17	Moderate	0.082
Stone, clay, and glass products (32)	0.49	Moderate	0.078
Chemical and allied products (28)	0.99	Moderate	0.078
Rubber and miscellaneous plastics (30)	0.69	Moderate	0.061
Electrical and electronic equipment (36)	2.31	Moderate	0.055
Food and kindred products (20)	1.63	Moderate	0.050
Nonelectrical machinery (35)	2.63	Moderate	0.049
Fabricated metal products (34)	1.87	M-Low	0.042
Printing and publishing (27)	1.68	Low	0.033

1. Industry employment as a percent of total employment in all U.S. MSAs.
2. Export activity group is relative to the service industry standard deviations, as defined in the text and in table 3.
SOURCES: U.S. Department of Commerce, Census of Manufactures 1982 (manufacturing industry employment by city); Department of Commerce County Business Patterns 1982 (total employment by city).

TABLE 4

VI. Exportability and the Strengths and Weaknesses of the Service Sector in the District

Does the Fourth District export services? This section examines evidence on the extent of concentration of Fourth District MSAs in export-intensive service industries.

Table 5 shows the industries in which the four major MSAs in the District were particularly strong. Also listed are the exportability group of each industry and the estimated number of jobs over the national average.

Personnel supply services consists of two main components: employment agencies and temporary help suppliers. From 1982 to 1984, temporary employment was the fastest-growing industry, with more than 50,000 employees in the U.S. (see Carey and Hazelbaker [1986]). Although many of the jobs are low-skill (laborer and clerical positions), there are two high-skill sectors of the market: engineering and technical.

Fourth District Service Industry Employment Surpluses by MSA in 1982

	Export Activity Group[1]	Employment Surplus[2]
Cincinnati		
Commercial photography, art and graphics	Moderate	220
Commercial sports and recreation	Moderate	230
Photographic finishing labs	Moderate	270
Management and public relations consulting	M-Low	300
Personnel supply services	M-Low	1,550
Services to dwellings and other buildings	Low	570
Cleveland		
Schools and educational services, not elsewhere classified	High	230
Stenographic and reproduction services	Moderate	220
Personnel supply services	M-Low	1,150
Detective agencies and protection services	Low	860
Other repair shops and related services	Low	550
Accounting, audit, and bookkeeping services	Low	610
Columbus		
Architectural services	Moderate	400
Management and public relations consulting	M-Low	1,960
Credit reporting and collection agencies	M-Low	1,330
Other repair shops and related services	Low	540
Services to dwellings and other buildings	Low	250
Pittsburgh		
Engineering services	Moderate	5,810
Testing laboratories and facilities	Moderate	370
Personnel supply services	M-Low	1,010
Detective agencies and protection services	Low	840

1. Export activity group is a grouping of industries by the standard deviation of the location quotients in that industry across all U.S. MSAs. See table 1 and text for explanation.
2. Surpluses are rounded to the nearest 10. Only industries with employment surpluses of more than 200 are included.
SOURCES: U.S. Department of Commerce, Census of Service Industries 1982 (service industry employment by city); Department of Commerce County Business Patterns 1982 (total employment by city).

TABLE 5

Temporary work affords workers an opportunity for flexible schedules and experimentation with positions. It allows employers to adjust to temporary employment needs due to seasonal or cyclical fluctuations, to employee absences, or to demand shifts of dubious permanence. The size of the industry in these Fourth District cities may indicate that local employers were more hesitant about adding permanent personnel than were others nationally. On the other hand, it may have signaled the beginning of growth: that is, as an indication of positions soon to be added to permanent staff.

If the prominence of personnel supply services results from the high-skill sectors, it may signal that the engineering and technical schools in Cleveland, Columbus, and Pittsburgh produce a concentration of technically skilled people who export some of their services to areas without such schools.

The most striking entry among the surpluses is engineering services in Pittsburgh; these exports generate about 5,800 jobs for the city's economy, over and above the jobs demanded for the local economy. Also of interest is the concentration by some of the cities in industries that are not, in general, characterized by export activity. In particular, Cleveland and Columbus show evidence of concentration in accounting, audit, and bookkeeping services, although this industry ranks the lowest in signs of export activity of all 27 industries analyzed. Perhaps this signals the beginning of a trend toward trade in these industries.

Patterns of consistency across cities are much stronger in the region's service employment deficits. Table 6 shows the industries in which the four MSAs were apparently net importers. In general, these four large cities import legal, research, hotel, computing, and engineering services. R&D labs and legal services both employ significantly fewer people than the national average in all four major Fourth District MSAs. The following industries appear three times on the lists: engineering services; computer

Fourth District Service Industry Employment Deficits by MSA in 1982

	Export Activity Group[1]	Employment Deficit[2]
Cincinnati		
Research and development laboratories	High	240
Hotels, motels, and lodging places	M-High	680
Engineering services	Moderate	740
Computer and data processing services	Moderate	610
Architectural services	Moderate	280
Legal services	Low	1,700
Accounting, audit, and bookkeeping services	Low	410
Cleveland		
Research and development laboratories	High	220
Hotels, motels, and lodging places	M-High	3,080
Engineering services	Moderate	490
Computer and data processing services	Moderate	1,280
Equipment rental and leasing services	Moderate	300
Management and public relations consulting	M-Low	990
Legal services	Low	550
Services to dwellings and other buildings	Low	990
Columbus		
Research and development laboratories	High	240
Engineering services	Moderate	490
Commercial sports and recreation	Moderate	480
Personnel supply services	M-Low	490
Detective agencies and protection services	Low	1,840
Legal services	Low	360
Pittsburgh		
Research and development laboratories	High	480
Hotels, motels, and lodging places	M-High	3,070
Commercial sports and recreation	Moderate	1,210
Computer and data processing services	Moderate	1,440
Equipment rental and leasing services	Moderate	440
Architectural services	Moderate	420
Management and public relations consulting	M-Low	350
Other repair shops and related services	Low	200
Legal services	Low	1,800
Services to dwellings and other buildings	Low	1,000
Accounting, audit, and bookkeeping services	Low	400

1. Export activity group is a grouping of industries by the standard deviation of the location quotients in that industry across all U.S. MSAs. See table 1 and text for explanation.
2. Deficits are rounded to the nearest 10. Only industries with employment deficits of more than 200 are included.
SOURCES: U.S. Department of Commerce, Census of Service Industries 1982 (service industry employment by city); Department of Commerce County Business Patterns 1982 (total employment by city).

TABLE 6

and data processing services; and hotels, motels, and other lodging places.

Hotels, in particular, stand out as a major deficit in Cleveland and Pittsburgh. This suggests that these cities "import" conventions and tourism; that is, people leave these cities to vacation or to attend conventions. The lack of local engineering services employment in Cincinnati, Cleveland, and Columbus may be due to imports of those services from Pittsburgh. The regional deficits in computer and data processing services employment suggest heavy importation of these services or slowness to begin using them (that is, deficient local demand), as of 1982. This deficit is particularly troubling because between 1974 and 1984, employment nationwide in this industry grew by 250 percent.

VII. Conclusion

The major points of this paper may be summarized as follows:

1. The composition of employment in the United States and in the Fourth Dis-

trict is shifting toward services. The Fourth District currently exceeds the nation in the growth of services as a whole and in the fast-growing business services.

2. Increased minimum efficient scale (MES) for the provision of producer services may be a basic reason for their growth. This implies that trade in services may increase, although as of 1982, there was apparently less trade in producer services than in manufacturing. Services, to the extent that they are exported directly to consumers outside a region, are viable members of the regional economic base.

3. In the producer services (in 1982), the four largest cities in the Fourth District each specialized in a different combination of services; only personnel supply services was an industry of concentration for more than two cities. The largest concentration was engineering services in Pittsburgh, which generated about 5,800 extra jobs.

4. Fourth District import patterns were more consistent across cities; employment deficits were pronounced in legal, research, hotel, computing, and engineering services for at least three cities out of four.

This information is particularly relevant to the Fourth District because of the recent national and regional decline in manufacturing employment. Can we expect the service industries to replace lost manufacturing dollars? If economies of scale rise in the services, interregional and international trade in services should continue to grow. There is no reason to expect dollars drawn into a region by services sales to have a smaller impact on wealth than dollars earned through manufacturing activity (assuming that income earned from service firms is spent similarly to that from manufacturing firms). The recent growth in services in the Fourth District suggests that they may be able to replace some of the lost manufacturing dollars, but it is unclear just how much replacement any region, and the Fourth District in particular, can expect.

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Identifying Amenity and Productivity Cities Using Wage and Rent Differentials

by Patricia E. Beeson
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Introduction

Many studies have explored the existence of nominal wage differentials between regions. The irrefutable conclusion is that wage differentials exist and that they persist over time.[1] Such differentials are difficult to explain within a neoclassical framework in which regions and factors are identical and all factors are free to move in response to interregional factor price differentials. In this case, one must resort to explanations based on institutional barriers and other impediments to free mobility.

The key to understanding how wage differentials (and other factor price differentials) can persist in the presence of free mobility is to recognize that some factors are inherently immobile. For instance, each region has geographic and climatic characteristics that are unique to the area. Even for those areas that share common features, the quality and quantity of the site-specific characteristics may differ. Therefore, firms or households will be willing to pay or accept different levels of wages depending upon the value they place on these attributes.

For instance, firms may find that proximity to improved harbors reduces shipping costs and thus reduces production costs. In this case, firms can offer higher wages and still remain competitive with firms in lower-wage regions because of the cost advantage of the harbor. Since land next to the harbor is limited, the influx of firms attracted by the harbor will increase the demand for both labor and land. Wages and rents will be bid up until the cost advantage of the harbor is completely offset by the increase in factor prices. Thus, wages and land rents vary across regions according to the value firms place on the site-specific attributes in each region and their ability to substitute between factors of production.

A similar story can be told about households. Households may value the same harbor that firms find attractive, except for different reasons. The harbor that reduced shipping costs for firms may be attractive to households as a place to enjoy water sports. Consequently, as more households move into the area to take advantage of the harbor, the supply of labor increases and the demand for land increases. Thus, wages fall and land rents rise until individuals are no longer willing to accept proximity to the harbor as compensation for lower wages and higher land rents.

The resultant wage differential between an area with a harbor and one without depends upon the relative magnitudes of the demand and supply responses to site characteristics. If wages are observed to be higher in the harbor area than in the area without a harbor, then the demand response (the firm's response) dominates the wage determination process. If wages are relatively lower in the harbor area, then the supply response (the household's response) dominates the process. In both cases, land rents will be higher because both households and firms value the harbor. Land rents would be

1 Bellante (1979), Johnson (1983), and Eberts and Stone (1986) are examples of numerous studies that have examined interregional wage differentials.

lower in the harbor area than in an otherwise comparable area if the harbor was detrimental to both parties. Consequently, by observing relative wages and rents, it is possible to identify whether a region's bundle of site characteristics has a greater net effect on firm location decisions or household location decisions.

The purpose of this paper is to identify metropolitan areas according to the extent to which they are dominated by supply and demand responses to their net bundle of site-specific characteristics. To do this, we estimate hedonic wage and rent equations for a sample of metropolitan areas. From these estimates, we derive quality-adjusted wage and rent differentials for each area. The metropolitan areas are then classified into four groups based on the relative values of an area's wage and rent differential vis-à-vis the national average. The metropolitan areas are identified as high amenity (low wage, high rent), low amenity (high wage, low rent), high productivity (high wage, high rent), and low productivity (low wage, low rent). Classification of this sort provides information about the relative attractiveness to firms and households of the total bundle of attributes indigenous to each metropolitan area.

I. A Model of Household and Firm Equilibrium

In this section, we first present a model, based on the work of Roback (1982), of the effects of interarea differences in amenities and productivity on wages and rents. We then show how this model can be used to determine the relative importance of amenity and productivity differences as sources of factor price differentials across cities.

Several simplifying assumptions are made in modeling the relationship between interarea differences in amenities and productivity and interarea differences in wages and rents. Workers are assumed to be identical in tastes and skills and completely mobile across cities. Similarly, capital is assumed to be completely mobile and production technologies are assumed to be identical across firms.[2]

In this model, cities are characterized as bundles of attributes, which can affect the utility of households and the costs of production for firms. Individuals in these cities consume and produce a composite consumption good. The price of the good is determined by international markets and for convenience is normalized to one. Each worker supplies a single unit of labor independently of the wage rate. We assume that individuals work in the city in which they live, and we treat differences in leisure resulting from differences in intracity commuting as a site characteristic.[3] Equilibrium in this model is characterized by equal utility for identical workers and equal unit costs for firms across all regions.

Workers choose the location that maximizes their utility, subject to an income constraint. Utility depends upon consumption of the composite commodity (X), residential land (L^c), and amenities (s). Equivalently, the problem can be stated in terms of an indirect utility function, V, which is a function of wages (w), rents (r), and amenities (s). Equilibrium for workers requires that utility is the same at all locations, or

(1) $V(w;r;s) = V^0$.

The equilibrium relationship between wages, rents, and amenities for households can be determined by totally differentiating the indirect utility function. In log form, this relationship can be stated as:

(2) $$\frac{\partial lnV}{\partial lnw}\frac{dlnw}{ds} + \frac{\partial lnV}{\partial lnr}\frac{dlnr}{ds} + \frac{\partial lnV}{\partial s} = 0.$$

Using Roy's identity, the marginal valuation of amenities in a city evaluated relative to the marginal utility of income is

(3) $$\frac{P_s}{w} = k_1 dlnr/ds - dlnw/ds,$$

where P_s is the monetized value of the amenities, and k_1 is the portion of consumer income spent on land. Equation 3 states that individuals pay for amenities through reductions in real income in the form of higher land rents (which reduce income by k_1 times the increase in rents) and lower wage income.

Firms are assumed to employ local residents and to use land to produce the composite commodity, X, according to a constant-returns-to-scale production technology. Under these assumptions, equilibrium for firms requires that unit costs are equal in all locations and equal to the price of X, assumed to be 1,

(4) $C(w;r;s) = 1$.

2 If people have different preferences, the value of certain areas will be understated in our approach, which uses a comparison of cost-of-living differences as an indication of the value individuals place on cities (see Roback [1982]). The second set of assumptions refers to the mobility of households and firms. We assume that migration is costless and that, given the relative wages, rents, and site characteristics across cities, both firms and households have chosen locations such that they could not be made better off by relocating. If moving is not costless, we may have biased estimates of the attractiveness of areas. Individuals or firms may perceive that they would be better off by moving, but if it is costly to do so they will move only if the extra benefits of moving outweigh the costs of moving. We may then be over- or underestimating the attractiveness of an area since we ignore the costs of moving.

3 Roback's model ignores intracity commuting. Hoehn, et al. (1986) have pointed out that this leads to incorrect estimates of the value of other site characteristics. Since we are not interested in deriving values for specific characteristics, but simply the net impact of these characteristics, our model is not subject to this criticism. We therefore simply assume that intracity commuting is another site characteristic that reduces leisure time and therefore is a disamenity for workers.

The relationship between wages, rents, and site characteristics (s), which are consistent with equilibrium for firms, can be expressed in log form as:

$$(5)\quad \frac{\partial lnC}{\partial lnw}\frac{dlnw}{ds} + \frac{\partial lnC}{\partial lnr}\frac{dlnr}{ds} + \frac{\partial lnC}{\partial s} = 0.$$

The marginal value to firms of different locations is

$$(6)\quad C_s = -\theta_r(dlnr/ds) - \theta_w(dlnw/ds),$$

where $-C_s$ is the price that firms are willing to pay to locate in one city rather than another, and θ_r and θ_w are the cost shares of land and labor, respectively.

If the site characteristics of a city provide a net productivity advantage to firms, then firms will pay for this advantage in terms of higher wages and rents and $-C_s$ will be positive. Wages and rents in each city are determined by the interaction of the location decisions of the households and firms.

Combinations of *lnw* and *lnr* for which the unit costs of firms are equal are depicted in figure 1b. The value of site characteristics to firms is fixed along each quasi-isocost curve, and the curves shift up (down) as the site characteristics of a city increase (decrease) the productivity of firms. The slope of the quasi-isocost curve is equal to the elasticity of substitution between land and labor, which from equation 6 is $-\theta_w/\theta_r$. According to figure 1b, site characteristics in city S_2 enhance productivity more than site characteristics in city S_1.

Each city is characterized by a bundle of amenities and site characteristics that are associated with a specific pair of isocost and iso-utility curves in figures 1a and 1b. The intersection of any two curves for each city then determines relative wages and rents. In figure 2, equilibrium wages and rents in city S_1 will be w_1 and r_1. Using city S_1 as a reference point

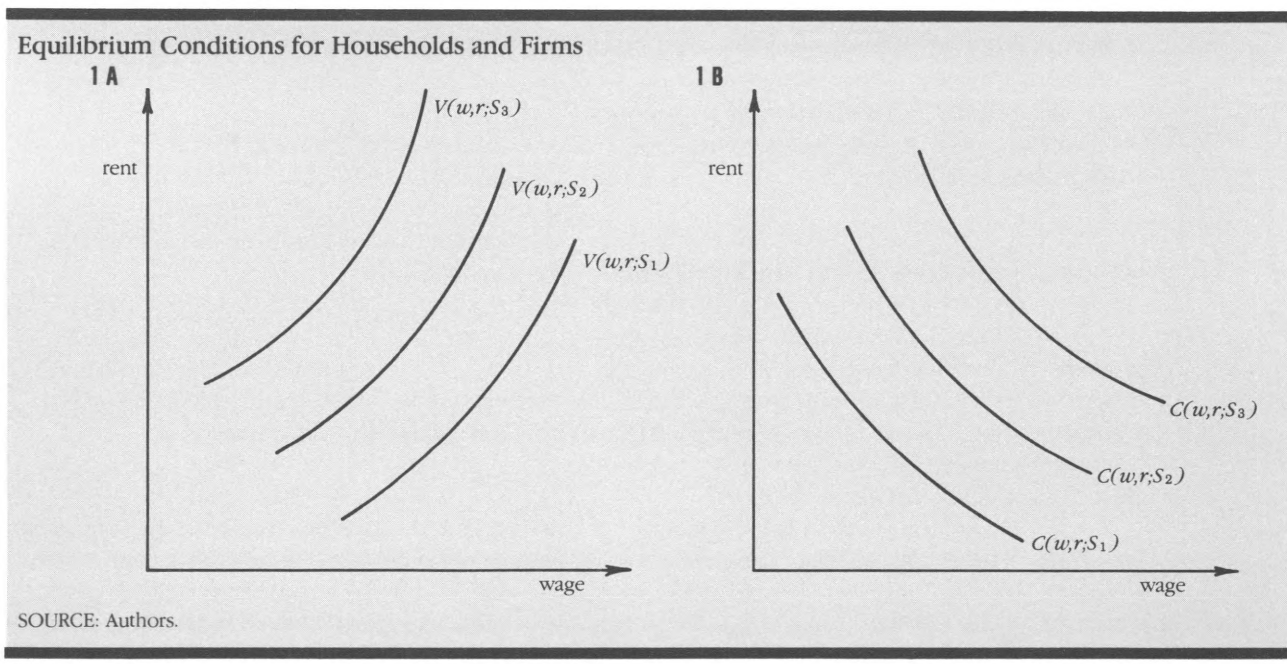


FIGURE 1

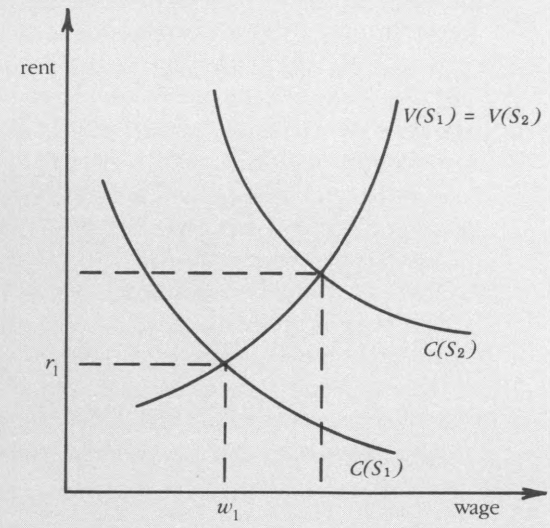
Classification of Cities as Amenity or Productivity Cities

The model described above is illustrated in figure 1. The upward sloping curves in figure 1a [labeled $V(.)$], show combinations of *lnw* and *lnr* for which utility is equal. The slope of these curves is the trade-off that households are willing to make between wages and rents for any given level of amenities. From equation 3, this trade-off is equal to the inverse of the budget share of land, k_1^{-1}. Along each curve, the value of amenities is fixed and the curves shift up (down) as the amenities of one city are valued more (less) than the amenities of other cities. The value of amenities in the city labeled S_2 is greater than the value of amenities in the city labeled S_1, since individuals are willing to pay higher rents at every wage rate.

(which could be thought of as the average city), we can see how intercity differences in amenities and productivity will be reflected in differences in wages and rents.

Consider a city S_2 that differs from S_1 only in that the site characteristics of city S_2 provide a greater productivity advantage to firms than the site characteristics of city S_1. In figure 2, this is illustrated by $C(S_2)$ lying above $C(S_1)$. Assuming there is no difference in amenities between the two cities, we can see that equilibrium requires that wages and rents in city S_2 be high relative to city S_1. These higher wages and rents reflect the amount firms are willing to pay to locate in city S_2 rather than S_1 and, therefore, the productivity value of S_2 relative to the average city.

Productivity Differences and Equilibrium Wages and Rents

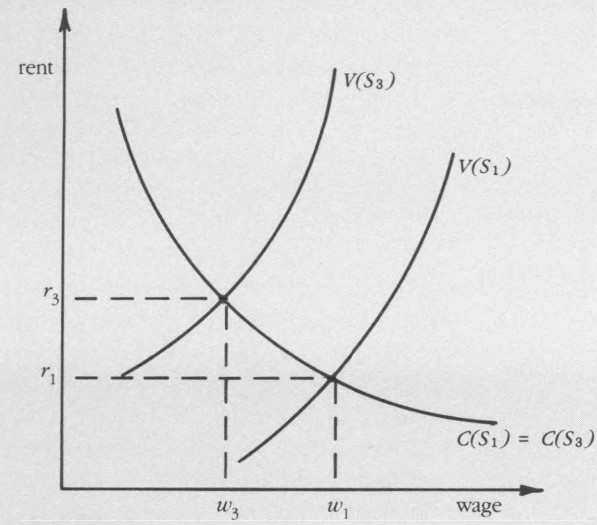


SOURCE: Authors.

FIGURE 2

Consider another city, S_3, that differs from S_1 only in that households find it to be more amenable. This relationship is illustrated in figure 3, where city S_3 is represented by $V(S_3)$, which is to the left of $V(S_1)$. If no productivity differences exist, [that is, $C(S_1) = C(S_3)$], the difference in the households' valuation of amenities across cities leads to lower wages and higher rents in the more amenable city, S_3.

Amenity Differences and Equilibrium Wages and Rents



SOURCE: Authors.

FIGURE 3

Within this simple framework in which cities differ in either amenities or productivity, but not both, we can determine whether factor price differences reflect intercity differences in amenities or productivity by examining the pattern of wages and rents across cities. If wage and rent differences primarily reflect amenity differences across cities, we would see a negative relationship between wages and rents. If they reflect productivity differences, the relationship would be positive.

Within the same framework, we can also classify individual cities on the basis of whether their wages and rents differ from the average because of above-average amenities, below-average amenities, above-average productivity, or below-average productivity. These classifications are summarized in table 1 and figure 4.

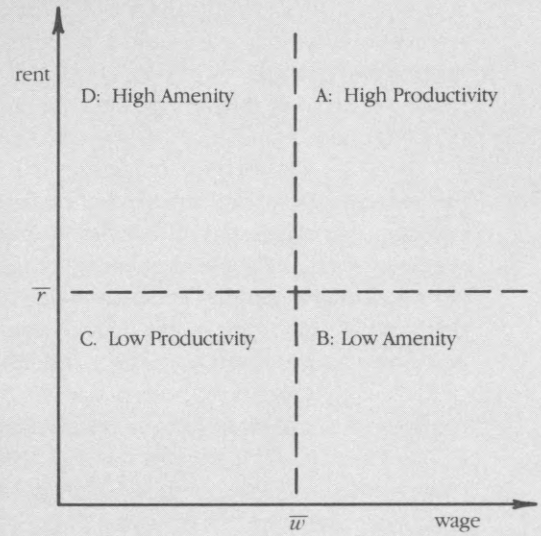
Of course, cities may differ in characteristics that affect both household utility and production costs. The problem of classifying cities by the relative magnitudes of these two effects becomes one of identifying the portion of the wage and rent differentials due to a shift in each curve. This can be done by identifying the combinations of *lnw* and *lnr* that would result from equal shifts of both curves and determining how wages and rents in each city fall relative to these shifts. The combinations of *lnr* and *lnw* that would result from equal shifts of both curves will form two lines with slopes that depend upon k_1^{-1} and $-\theta_w/\theta_r$. If k_1^{-1} (the slope of the V_s curve) is equal to θ_w/θ_r (the negative of the slope of the C_s curve), the combinations of *lnw* and *lnr* resulting from equal shifts of both curves would coincide with the x and y axis.

Assuming for illustration that this is the case, for any city with above-average wages and rents, the shift of the C_s (productivity) curve must be greater than the shift of the V_s (amenity) curve. Therefore, any city with wage and rent combinations in quadrant A in figure 4 is classified as a "high productivity" city, because the *primary* reason that this city's wages and rents differ from those of the average city is the above-average productivity it affords firms. This above-average productivity is reflected in the ability of firms in these cities to pay above-average wages and rents.

Similarly, cities with below-average wages and rents (quadrant C in figure 4) are classified as "low productivity" cities, since firms in these cities are compensated for the below-average productivity related to site characteristics with below-average factor costs.

Above-average amenities in a city are associated with increases in rents and decreases in wages reflecting households' willingness to pay for the amenities. Quadrant D then identifies cities where the dominant factor determining relative wages and rents is high amenities. For cities in quadrant B, the dominant factor is their below-average amenity value.

Classification of Cities



SOURCE: Authors.

FIGURE 4

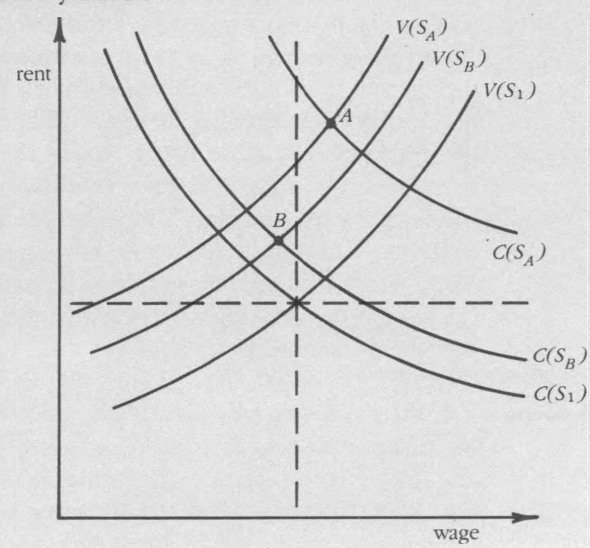
Classification of Cities

City Classification	Direction of Price Differential: Wage	Rent	Shift
High productivity	High	High	$C(S_i)$ curve up
Low productivity	Low	Low	$C(S_i)$ curve down
High amenity	Low	High	$V(S_i)$ curve up
Low amenity	High	Low	$V(S_i)$ curve down

SOURCE: Authors.

TABLE 1

Classification of Cities and the Relative Productivity and Amenity Effects



SOURCE: Authors.

FIGURE 5

These labels may be misleading in that what we are referring to as "high productivity" cities are not necessarily more or less attractive to households than the "high amenity" cities. A city like the one represented by point A in figure 5 is relatively attractive to both households and firms. This relationship can be seen by the positions of $C(S_A)$ and $V(S_A)$ relative to the average city. The effect that dominates, however, is the productivity effect, since the shift of the C_s curve is greater than the shift of the V_s curve.

Another city like the one represented by point B may be less attractive to both firms and households than city A (again reflected in the relative positions of the amenity and productivity curves). However, the dominant trait of city B is its amenities, which are above average.

II. Estimation

The analysis is based on wage and rent data for a sample of recent movers drawn from the Public Use Microdata Sample of the 1980 Census of Populations. This subsample includes individuals who lived and worked in the same Standard Metropolitan Statistical Area (SMSA) in 1980 and who changed addresses between 1975 and 1980. This subsample of movers was chosen because housing prices of recently acquired or rented dwellings more accurately reflect current land market conditions.

The rent equation includes both owner-occupied and rental units for which positive values of unit or gross rent are reported. The dependent variable in the rent equation is gross monthly housing expenditures. For homeowners, the monthly housing expenditure is based on the value of the dwelling using 7.85 percent as the discount rate.[4] The monthly housing expenditure is the sum of this imputed rent and monthly utility charges. For renters, the monthly expenditure is gross rent (contract rent plus utilities).

Individuals included in the wage sample had to meet the following criteria. Individuals had to be between the ages of 25 and 55; work more than 25 hours per week; not be self-employed; and have positive wage and salary income. The dependent variable in the wage equation is average weekly earnings, which is calculated by dividing annual wage and salary income by the number of weeks worked.

4 The discount rate is from a study of the user cost of capital by Peiser and Smith (1985).

Quality-Adjusted Wages

A hedonic approach is used to estimate wage differentials across SMSAs. This approach uses regression analysis to determine the value the market places on different worker characteristics. An individual's wage is then predicted based on the value of his or her characteristics. The first step in constructing the wage indexes is to specify estimable equations that reflect appropriate individual characteristics of workers that could affect wages. Our approach follows the human capital specification of individual wages set forth by Hanoch (1967) and Mincer (1974). Thus, we specify individual wages (expressed in logarithms) as a function of education level (entered as a quadratic), potential experience (age minus years of education minus six, also entered as a quadratic), a binary variable indicating part-time employment status (less than 35 hours per week), and 42 binary occupation variables (with one omitted as a constant). Binary variables are also entered to account for gender, race, marital status, union affiliation, and whether or not an individual is a veteran.[5] In addition, the gender variable is interacted with other characteristics in order to control for male/female differences in the rate of return to these attributes.

The estimated coefficients of the wage equation are presented in table 2, except for the occupation variables, which are omitted for brevity. The estimated coefficients are as expected. Education and experience are valued positively in the labor market, while part-time, female, and nonwhite workers receive lower wages than their otherwise identical counterparts. We also find that individuals who are married, heads of households, and in highly unionized industries earn more than their counterparts. Females receive less return on experience than males.

The predicted wage level for each worker in the sample is obtained by multiplying the estimated coefficients by each worker's characteristics. The predicted wage can be interpreted as the compensation a worker could expect to receive, given his or her characteristics, regardless of geographic location. Subtracting the predicted wage from the actual wage nets out the portion of the actual wage that is related to the individual worker's characteristics. The skill-adjusted metropolitan wage differentials are then obtained by averaging the wage residuals (actual minus predicted wage) for all workers in a particular metropolitan area. Average wage differentials are calculated for each of 38 cities. The 38 metropolitan areas are chosen by including only those SMSAs for which 100 or more individuals in the sample were recorded as movers between 1975 and 1980. The quality-adjusted wage differentials are displayed in table 4.

Estimates of Wage Equation

Variables	Mean	Coefficient
Intercept	—	4.33
		(50.19)
Sex (Female = 1)	.42	-.083
		(-5.00)
Race (Black = 1)	.16	-.161
		(-11.57)
Education	15.55	.043
		(5.16)
Education squared	250.37	.0007
		(2.81)
Experience	10.29	.043
		(25.12)
Experience squared	192.33	-.0008
		(-15.63)
Part time	.04	-.308
		(-14.44)
Usual hours worked per week	42.05	.006
		(10.84)
Head of household	.64	.111
		(10.20)
Veteran	.20	-.017
		(-1.53)
Sex x Race	.08	.111
		(5.47)
Sex x (Marital status)	.22	-.058
		(-3.14)
Sex x Experience	4.10	-.019
		(-7.81)
Sex x (Experience squared)	76.82	.0003
		(3.54)
Marital status	.62	.108
		(9.62)
Union member	.25	.434
		(14.12)
(42 Occupation Dummies)		
R-square		.34
No. observations	22,313	
Dependent variable: log (weekly earnings)	5.50	

Note: Estimates derived from Public Use Microdata Sample. T-statistics in parentheses.
SOURCE: Authors.

TABLE 2

Rent Equation

The method used to calculate quality-adjusted rent differentials is similar to the one used to calculate quality-adjusted wage differentials. The log of monthly housing expenditures is regressed

[5] The measure of unionization in the wage equation is the industry unionization rate taken from Kokkelenberg and Sockell (1985).

Estimates of Rent Equation

Variables	Mean	Coefficient
Intercept	—	9.93 (248.36)
Dwelling rented (=1)	.53	.084 (1.35)
Central city (=1)	.14	-.05 (-3.29)
x rental		.021 (1.70)
Number of floors	1.10	.122 (5.43)
x rental		-.056 (-2.62)
Attached dwelling (=1)	.06	.06 (2.41)
x rental		.027 (1.17)
Year dwelling built	3.65	-.06 (-17.98)
x rental		-.018 (-4.94)
Number of rooms	7.07	.11 (22.80)
x rental		-.032 (-5.64)
Number of bedrooms	4.25	.10 (9.96)
x rental		.011 (1.03)
Well water (=1)	.14	.06 (3.70)
x rental		-.027 (-.83)
Central air conditioning (=1)	.52	.12 (9.13)
x rental		.038 (2.82)
Central heating (=1)	.91	.12 (6.35)
x rental		-.058 (-4.14)
Dwelling other than condominium (=1)	.96	-.046 (1.62)
Number of units at address	2.92	-.003 (-.65)
x rental		.007 (1.41)
Number of bathrooms	2.72	.179 (32.03)
x rental		-.056 (-6.73)
City sewer connection (=1)	.87	.053 (4.27)
x rental		.004 (.18)
Lot size less than one acre (=1)	.92	-.130 (8.72)
x rental		.185 (8.07)
Elevator (=1)	.04	.065 (2.45)
R-square		.63
No. observations	16,017	
Dependent variable: log (house value)	11.07	

Note: Estimates derived from Public Use Microdata Sample. T-statistics in parentheses. The entry "x rental" indicates that the rental dummy variable has been interacted with the variable listed immediately above it.
SOURCE: Authors.

TABLE 3

against housing attributes. These characteristics include the number of rooms, number of bedrooms, number of bathrooms, and separate binary variables indicating location of the dwelling in the central city, and whether or not the dwelling is a single structure, has central air conditioning and/or heating, is connected to a city sewer system, and has well water. The year the dwelling was built is entered to proxy the vintage. Dwelling characteristics are interacted with rental status in order to account for differences in the valuation of these attributes between rented and owner-occupied dwellings.

Coefficient estimates are reported in table 3. The results are as expected. Larger, newer dwellings with central air and heating and that are located outside the central city have higher market value than otherwise identical homes. In general, attributes of rentals are valued less than otherwise identical owner-occupied dwellings. The predicted rent is calculated by multiplying the estimated coefficients by the housing characteristics of each household. The quality-adjusted rent differentials presented in table 4 are the differences between the actual and predicted house values.

By including a number of housing characteristics in the rent equation, the difference between actual and predicted house values can be interpreted to reflect primarily land values in specific geographical locations. Thus, quality-adjusted rent differentials relative to the national average reflect differences in city land values, which are due primarily to the capitalized effects of differences in site characteristics.

Land Shares

In addition to the quality-adjusted wage and rent differentials, our classification of cities requires estimates of the share of household income spent on land (k_1) and the ratio of the income shares of land and labor in production (θ_r/θ_w). These values are not readily available for each specific metropolitan area. Thus, we use national estimates and assume that the portion of household income spent on land and the ratio of labor income to land income in production are constant across metropolitan areas and equal to the national average.

The budget share of land is calculated by multiplying the fraction of income spent on housing (27.0 percent in our sample) by the ratio of land value to the total value of the house (estimated to be 19.6 percent).[6] From these estimates, land's share of household income (k_1) is

6 The ratio of land value to total house value was estimated by Roback using FHA housing data. Unfortunately, the census data used in this study cannot be used to make a new estimate.

5.3 percent. The ratio (θ_r/θ_u) is calculated by subtracting our estimate of k_1 from the ratio of the total income to land (6.4 percent of national income) relative to total labor income (73 percent of national income).[7] The ratio of these income shares is 8.8 and the estimate of θ_r/θ_u is 3.5.

III. Classification of Cities

As discussed in section I, we can determine whether wage and rent differentials reflect variations in productivity or amenities across SMSAs by examining the pattern of wage and rent differentials across SMSAs. If intercity wage and rent differentials primarily reflect amenity differences, we should observe a negative relationship between wages and rents. If they primarily reflect productivity differences, the relationship should be positive.

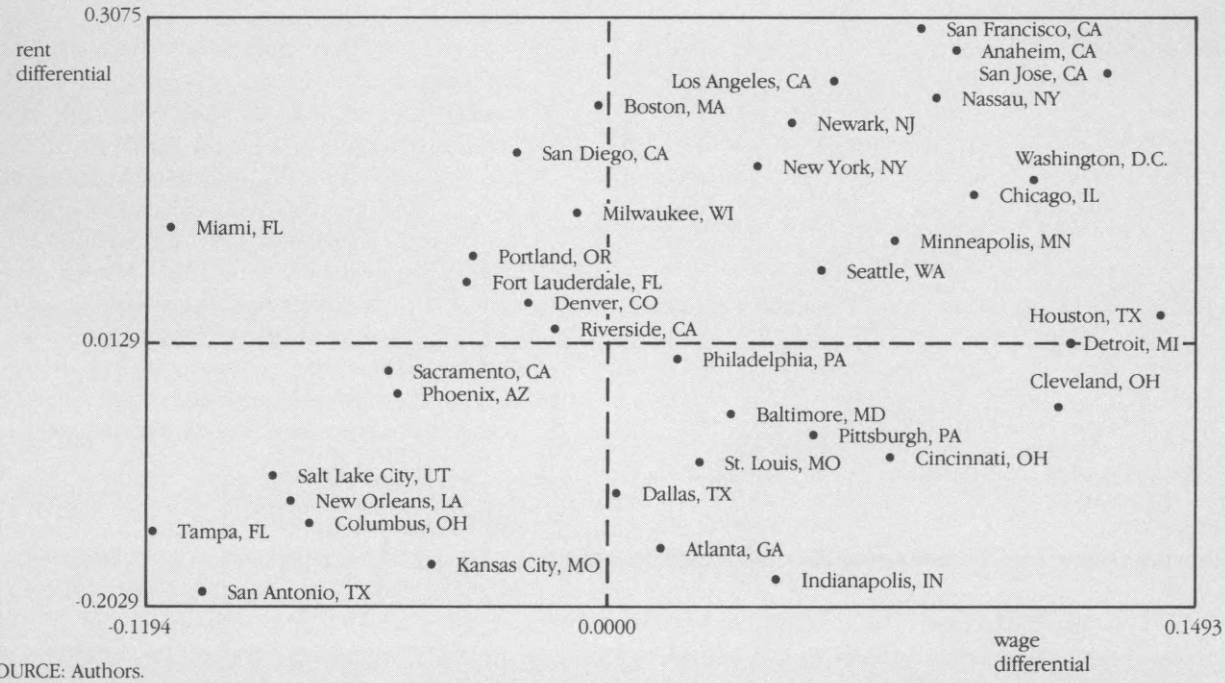
The quality-adjusted wages and rents for the SMSAs in our sample are presented in figure 6. It appears from figure 6 that there is a slight positive relationship between wages and rents in our sample. Using the same amenity and productivity quadrants found in figure 4, more SMSAs lie in the "productivity" quadrants than in the "amenity" quadrants. This is confirmed by a positive correlation coefficient of 0.46. The relatively small value of the coefficient suggests that the relationship is not the same across all SMSAs.

We now proceed to determine whether deviations from the average wages and rents for individual SMSAs primarily reflect a) above-average amenities, b) below-average amenities, c) above-average productivity, or d) below-average productivity.

In order to determine the combinations of wages and rents that fall into each of these categories, we must first determine the wage and rent combinations that form the boundaries for these categories. These boundaries are determined by the combinations of wages and rents that would result from equal shifts of the V_s and C_s curves relative to the average SMSA. Using the estimates of land shares discussed above, we find that for all practical purposes these boundaries coincide with the x and y axis in figure 6.[8]

A listing of cities in each category is presented in table 5. Most of the SMSAs fall

Standard Metropolitan Statistical Areas Included in Sample



SOURCE: Authors.

FIGURE 6

7 The estimate of labor compensation is taken from the national income account data reported in Table B-23 of the Economic Report of the President (1987). Unfortunately, the national income accounts do not include land income as a separate category of income. Our estimate of land's share of income is taken from Mills and Hamilton (1984).

8 The exact boundaries are two lines that pass through the origin, one with a slope of -.003, the other with slope 333. We classified cities based on these boundaries, but the classifications do not change if one uses the x and y axis as reference points.

Quality-Adjusted Rent and Wage Differentials[a]

Metropolitan Area	Quality-Adjusted Rent	Quality-Adjusted Wage
Anaheim, CA	.281	.078
Atlanta, GA	-.145	.014
Baltimore, MD	-.075	.031
Boston, MA	.220	-.001
Chicago, IL	.104	.081
Cincinnati, OH	-.082	.064
Cleveland, OH	-.053	.108
Columbus, OH	-.126	-.074
Dallas, TX	-.103	.001
Denver, CO	.036	-.013
Detroit, MI	.013	.149
Ft. Lauderdale, FL	.039	-.029
Houston, TX	.023	.142
Indianapolis, IN	-.172	.041
Kansas City, MO	-.155	-.037
Los Angeles, CA	.261	.049
Miami, FL	.076	-.112
Milwaukee, WI	.100	-.002
Minneapolis, MN	.073	.065
Nassau-Suffolk, NY	.240	.077
New Orleans, LA	-.110	-.079
New York, NY	.145	.036
Newark, NJ	.195	.045
Philadelphia, PA	-.013	.017
Phoenix, AZ	-.029	-.047
Pittsburgh, PA	-.079	.047
Portland, OR	.059	-.027
Riverside-San Bernardino, CA	.016	-.008
Sacramento, CA	-.014	-.047
St. Louis, MO	.085	.019
Salt Lake City, UT	-.099	-.081
San Antonio, TX	-.203	-.105
San Diego, CA	.148	-.014
San Francisco, CA	.308	.073
San Jose, CA	.269	.125
Seattle, WA	.048	.047
Tampa, FL	-.142	-.119
Washington, D.C.	.116	.103

a. Quality-adjusted differentials are obtained by subtracting the predicted estimate from the actual value. The reference point for these estimates is the sample average.
SOURCE: Authors.

TABLE 4

within expected classifications. For instance, Miami, Denver, Portland, Ft. Lauderdale, and San Diego are classified as high-amenity cities, since these cities are characterized by below-average wages but above-average rents, both of which reduce the income of households.

In cities like Baltimore, Cleveland, Pittsburgh, and Atlanta, wages and rents primarily reflect the below-average amenity value to households of these cities. Households in these cities receive compensation for this low amenity value in the form of above-average wages and below-average rents.

SMSAs that can be characterized as "high productivity" include Chicago, Houston, Los Angeles, and San Jose, among others. For these cities, both wages and rents are above average, suggesting that the firms in these cities are compensated for high factor costs by other locational characteristics of these cities. SMSAs like Tampa, New Orleans, and San Antonio can be characterized as "low productivity." Firms in these areas are compensated for the below-average productivity value of site characteristics in the form of lower wages and rents.

Classifying SMSAs according to the dominant effect of their site characteristics does not mean that a high-productivity city has no amenity value. It simply means the city is dominated by its productivity characteristics. Using equations 3 and 6, we can develop relative rankings of cities within the productivity groups by amenities and within the amenity groups by productivity. The ordering of cities in table 5 reflects this sort of cross classification. For example, of the high-productivity cities, New York, Los Angeles, and Seattle are considered more amenable than Chicago, Houston, and Detroit. Of the high-amenity cities, Boston is more attractive to firms than Miami.

The classifications of some cities are questionable, especially for cities near the boundaries. For some cities like Boston and Milwaukee, rents are considerably higher than average, but wages are so close as to be indistinguishable from the average. As a result, we cannot be confident in our classification of these cities as high productivity or high amenity, although we can be fairly confident that they are not low-amenity or low-productivity cities. Philadelphia and Riverside are examples of cities that are so close to the average in both wages and rents that their classifications may also be meaningless.

IV. Conclusion

In this paper, we have utilized the relationship between regional wage and rent differentials to identify cities by the net effect of their bundle of site characteristics on firms and households. We have found that, on average, firms respond more to site characteristics than households, as is revealed in the relatively large contribution of demand effects to determining regional wage differentials. Nevertheless, the amenity (or household) component of the total regional differential is also significant. Thus, regional wage differentials result from the interplay of the forces of supply and demand and exist even though individuals move freely in response to factor price

Classification of Cities

High Productivity	Low Productivity
New York, NY	Tampa, FL
Newark, NJ	San Antonio, TX
Los Angeles, CA	Salt Lake City, UT
Seattle, WA	New Orleans, LA
San Francisco, CA	Columbus, OH
Minneapolis, MN	Sacramento, CA
Anaheim, CA	Phoenix, AZ
Nassau-Suffolk, NY	Kansas City, MO
Chicago, IL	
Washington, D.C.	
San Jose, CA	
Houston, TX	
Detroit, MI	
High Amenity	**Low Amenity**
Boston, MA	Cleveland, OH
San Diego, CA	Cincinnati, OH
Milwaukee, WI	Pittsburgh, PA
Denver, CO	Philadelphia, PA
Riverside, CA	Baltimore, MD
Portland, OR	St. Louis, MO
Ft. Lauderdale, FL	Indianapolis, IN
Miami, FL	Dallas, TX
	Atlanta, GA

NOTE: Productivity cities are listed from the most amenable to the least. Amenity cities are listed from the most productive to the least.
SOURCE: Authors.

TABLE 5

differentials. Thus, so long as regions differ in the amount and quality of their site-specific characteristics, wage differentials will continue to exist.

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FSLIC Forbearances to Stockholders and the Value of Savings and Loan Shares

by James B. Thomson

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Introduction

Policies of forbearance to stockholders of insolvent firms by federal deposit guarantors represent a wealth transfer from federal deposit-insurance agencies, and ultimately from federal taxpayers, to the stockholders of the insured institutions. Kane (1985, 1986), Pyle (1986), and Thomson (1987) discuss theoretical determinants of the value of forbearances to stockholders of financial institutions by the Federal Deposit Insurance Corporation (FDIC) and the Federal Savings and Loan Insurance Corporation (FSLIC). Brickley and James (1986) show empirically that the stock-market returns of thrifts increase with the extension of FSLIC capital forbearances.

This paper investigates the relationship between the market and book values of the firm's equity. It demonstrates that the market value of a thrift is positively related to its book value and to the value of its unbooked assets. We argue that one of the major unbooked assets of a thrift is its FSLIC insurance guarantee. Measures of FSLIC forbearance policy are shown to be related to the market value of the thrifts whose market values exceed their book values.

Section I of this paper discusses the relationship between the market value and book value of a firm. It outlines the reasons that these values may diverge and argues that FSLIC guarantees are one of the unbooked assets valued by the market. Section II gives a brief overview of the empirical evidence and theoretical arguments regarding the value of federal deposit guarantees and forbearances. Section III describes the data, the sample selection criteria, the regression experiment used to test the forbearance hypothesis, and the empirical results. The conclusions and policy implications of the paper are presented in section IV.

I. The Relationship Between Market and Book Values

The book value of a firm's equity is measured as the difference between the book value of the firm's assets-in-place and the par value of its liabilities. The book value of assets may not equal their market value for three reasons. First, the accounting conventions used by most firms carry assets at their par, or acquisition, value and do not reflect subsequent changes in the market value of the assets. The market value of the assets would include these unbooked gains and losses. Second, because book values tend to include only assets-in-place, they do not measure the value of options for future business that are unique to the firm.[1] Finally, to avoid taxes, burdensome regulations, or restrictive debt covenants, some firms may engage in activities that are not carried on their books. The assets (liabilities) associated with these activities would not show up in book measures of assets (liabilities), but would nonetheless be reflected in their market values.

1 Myers (1977) and Warner (1977) argue that the market value of the firm's assets includes both the market value of the assets-in-place and the market value of the firm's options for profitable future business opportunities. Therefore, if the firm carried its assets-in-place at market value, the book value of the firm would understate its market value.

On the other side of the ledger, the firm carries its liabilities at par. Like the assets, the liabilities' market value includes unbooked changes. The market value of the firm's liabilities also includes off-balance-sheet financing and other types of contingent liabilities not reflected in book values (see Bennett [1986] and Forde [1987]). Therefore, the book value of the firm's equity will differ from its market value if the errors in the book measures of the firm's assets and liabilities do not completely offset one another.

Unbooked Losses and Gains in Thrift Portfolios

The market value of a thrift institution's assets can be separated into the market value of its assets-in-place and the market value of its charter. The market value of the assets-in-place may not equal their book value because the accounting procedures that thrifts and their regulators use to calculate book values do not take into account unrealized gains and losses on the thrift's asset portfolio.

For example, thrifts hold a large volume of fixed-rate mortgages, whose market values fluctuate inversely with interest rates. When interest rates rise, the market values of the mortgages decrease while the face value of the mortgage portfolio remains constant. Because thrifts are not forced to recognize capital losses on the mortgages until they are sold (or until the customer defaults), an increase in interest rates causes the book value of the mortgage portfolio to exceed its market value and the market value of the assets-in-place to be less than their book value.

Another source of unbooked capital gains and losses in the thrift's portfolio are real estate holdings. Thrifts tend to carry real estate on their books at acquisition price, which may not equal the current value of the real estate. The real estate portfolios of many thrifts are likely to be carried on their books at a discount from market value, which may cause the book value of the thrifts to be less than their market value.

The Value of Thrift Charters

The charter value of a thrift reflects the value of its unbooked assets.[2] We can divide the value of the thrift's charter into five categories. The first is the value of business relationships built over time. Kane and Malkiel (1965) argue that long-standing customer banking relationships have value because they lower the information and contracting costs associated with doing business. The reduction in the cost of servicing long-standing customers is available only to the servicing thrift and is a source of profitable future business opportunities.

Firm-specific options for profitable future business opportunities are the second source of the charter's value. These options may be available to the thrift because it has developed expertise in servicing a particular segment of the market. The third source is monopoly rents that may accrue to the thrift from restrictive branching laws and other regulations that restrict competition.

The fourth source of the charter's value is access to Federal Home Loan Bank Board (FHLBB) advances. The FHLBB makes secured loans to member thrifts at subsidized rates. These advances represent both a direct subsidy and an inexpensive source of backup liquidity. The fifth component of the charter's value is federal deposit guarantees. Kane (1985, 1986) maintains that the mispricing of deposit insurance and the use of forbearance policy by federal deposit guarantors has made the value of deposit guarantees an important source of thrift charter values.

II. FSLIC Subsidies, Forbearances, and the Market Value of Thrift Institutions

A new and growing body of literature addresses the value of federal deposit insurance subsidies and forbearances to insured depository institutions. Kane (1985, 1986) argues that the aggregate net worth of the thrift industry, net of the value of deposit guarantees and forbearances, is negative. Pyle (1986) shows that the the use of capital forbearances increases the value of deposit guarantees. Brickley and James (1986) empirically demonstrate a positive relationship between the adoption of a capital forbearance policy by the FHLBB and the market value of thrift institutions. Ronn and Verma (1986) show that estimates of the fair value of deposit guarantees are extremely sensitive to assumptions regarding the forbearance policy the FDIC employs when disposing of failed banks. Thomson (1987) breaks down the value of the deposit guarantee into three components: the value of the guarantee on insured deposits, the value of a conditional guarantee on the uninsured deposits, and the value of a conditional guarantee of the stockholders' claim on the residual future earnings of the insured institution. This paper is concerned with the value of forbearances to the stockholders of insured institutions.

The federal deposit insurance agencies extend forbearances to stockholders of insolvent institutions in two ways. The first, and politically preferred, method is to allow the institutions to operate after they are discovered to be insol-

2 Buser, Chen, and Kane (1981) maintain that the FDIC attempts to preserve the value of the banking charter when disposing of a failed bank, by using the charter's value to reduce the disposal costs. If the bank is disposed of via a purchase-and-assumption transaction, the purchase premium paid by the bank acquiring the failed bank reflects the value of the charter to the acquiring institution.

vent.[3] The de jure failure of a federally insured bank or thrift is an event timed by the regulators. The extension of explicit or implicit guarantees to the claims of uninsured depositors and general creditors of the insolvent bank or thrift removes the incentives of these individuals to force the closing and reorganization of the institution.[4]

A forbearance policy that does not at least close out the position of stockholders in insured depository institutions that are found to be insolvent has value to the stockholders (see Thomson [1987]). It represents an option on the future residual earnings of the institution. The behavior of the stock of Beverly Hills Savings and Loan (BHSL) of California is evidence that this type of forbearance has value. At the end of March 1985, roughly one month before it was closed by the FHLBB, the stock of BHSL had a market value of $19.21 million, while the book value of its equity was –$58.091 million.[5]

The second way stockholders receive forbearances from the federal deposit insurer is when the federal deposit guarantor uses open-bank assistance to handle the failure (or to head off the imminent failure) of an insured institution.[6] In this case, the federal deposit guarantor may preserve some or all of the value of the stockholders' claim on the residual future income of the institution.

For example, when the FDIC bailed out the Continental Illinois Bank and Trust Company of Chicago (Continental) in 1984, it gave the original stockholders warrants allowing them to purchase shares in the reorganized institution. The estimated value of these warrants was approximately $155 million (close to 20 percent of the estimated equity value of the reorganized Continental) on the day after the bailout package was announced.

The probability that federal deposit guarantors will extend forbearances to stockholders of insolvent insitutions is a function of constraints on the guarantors' ability to reorganize insolvent institutions. Kane (1986) places these constraints into four categories: political and legal constraints, information constraints, staff constraints, and funding constraints reflected in the implicit and explicit reserves of the insurance fund. Sprague's (1986) account of the FDIC's decision to bail out Continental makes it clear that the first three constraints played a major role in that bailout. Barth, et al. (1985) show that the ability of the FSLIC to close insolvent thrift institutions is directly related to the solvency of the FSLIC insurance fund.

III. Empirical Issues

The Data

The sample consists of 43 thrifts that meet the following criteria. First, to measure the market value of equity, we had to be able to obtain stock price and share data on the thrifts from Data Resources Incorporated's (DRI) Security Price File from March 1984 to the end of June 1986. Second, the thrifts had to be insured by the FSLIC. Third, balance-sheet and income-statement data had to be available from the FHLBB's Quarterly Reports of Condition and Income. Finally, to remove the effects of nonthrift subsidiaries from the results, we excluded all thrift holding companies.

The requirement that the thrifts' stock must trade on the market restricts the sample to the largest firms in the industry. For example, at the end of June 1986, the average size (measured in total assets) of the thrifts in our sample was $1.895 billion.[7] This is considerably larger than the size of the average thrift in the population. Therefore, one should be careful in generalizing the results of the tests on this sample to the population. We do not expect the other sample selection restrictions to materially affect the results.[8]

To construct proxy variables for our tests, we draw on theoretical arguments (see Beaver, et al. [1970], Bowman [1979], Myers [1977], and Unal and Kane [1987]); empirical findings (see Barth, et al. [1985], Benston [1986],

3 Net worth certificates and capital forbearances are two of the tools that politicians and industry regulators use to forestall the closing of insolvent institutions (see Nash [1987] and McTague [1987]).

4 The deposit guarantor must provide the uninsured depositors with a guarantee of the market value of their claim at the time the institution is discovered to be insolvent on a market-value basis.

5 The BHSL was admitted to the FHLBB's management consignment program on April 25, 1985. At that time, the book value of its assets was $2.939 billion, and its *TNW* was -$58.091 million. On June 6, 1986, the reported *TNW* of BHSL was -$540 million. In fact, the decline in BHSL's net worth under the FHLBB's management consignment program occurred when interest rates were falling. The one-year secondary market Treasury bill rate was 8.22 percent on April 26, 1985, and 6.14 percent on June 6, 1986. Thus, it is fairly clear that the positive market value of BHSL before its closing was not due to unrealized capital gains on BHSL's portfolio.

6 On December 4, 1986, the FDIC announced that it had set up formal guidelines for the use of open-bank assistance in handling troubled and failed banks (see McTague [1986]).

7 The largest (smallest) thrift in the sample at the end of June 1986, measured in terms of total assets, was $10.551 billion ($164.226 million).

8 To test the sensitivity of the results to survival bias, we replicate the cross-section regression experiments using a sample that includes all firms in the sample with complete information for that quarter. Because the number of firms varies across quarters, we do not attempt to pool this sample. Overall, the results over the larger sample support the paper's main results.

Results from the SMVAM Regressions[a]
(Using GAAP Net Worth[b])

Quarter	Number	*MKTVAL*[c]	*TNW*[d]	U_e	k	R^2
1984 1	43	39506.73	60367.47	14006.78†	0.42241††	0.7749
				(4.288)[e]	(16.243)	
2	43	37452.41	62386.19	12627.56†	0.39792††	0.7039
				(3.317)	(14.936)	
3	43	39170.32	63704.42	10493.50†	0.45015††	0.7502
				(2.695)	(13.553)	
4	43	40985.42	65153.79	6560.23	0.52837††	0.7707
				(1.482)	(10.479)	
1985 1	43	47330.67	67189.88	5920.71	0.61631††	0.8269
				(1.332)	(8.714)	
2	43	55950.50	71629.05	5789.46	0.70029††	0.8324
				(1.092)	(6.107)	
3	43	51973.94	74923.77	10687.99*	0.55104††	0.7742
				(2.044)	(9.660)	
4	43	62388.50	77475.47	8304.28	0.69808††	0.7772
				(1.232)	(5.173)	
1986 1	43	79638.41	84108.60	10490.68	0.82212††	0.8180
				(1.354)	(2.937)	
2	43	83701.49	85911.07	21001.71**	0.72982††	0.6939
				(1.968)	(3.569)	

a. Model: $MKTVAL = U_e + kTNW + e$.
b. Net worth computed using generally accepted accounting procedures.
c. Average market value of thrift stock (000's).
d. Average book value of thrift equity (000's).
e. T-statistics in parentheses.
† Significantly different from zero at 1%.
†† Significantly different from one at 1%.
* Significantly different from zero at 5%.
** Significantly different from zero at 10%.
SOURCE: Author.

TABLE 1

Brickley and James [1986], and Lee and Brewer [1985]); and the deposit-forbearance literature (see Kane [1986], Pyle [1986], Ronn and Verma [1986], and Thomson [1987]). The following proxy variables are constructed from stock-market data and balance-sheet and income data.

MKTVAL = market value of the thrift's stock. *MKTVAL* is the product of the price of the thrift's stock and the number of shares outstanding, or the market value of equity.

TNW = net worth according to generally accepted accounting principles. *TNW* is the book value of equity.

LIQ = proxy variable for liquidity. *LIQ* is nondeposit liabilities divided by total book liabilities.

DIV = proxy variable for diversification of assets. *DIV* is the sum of nonmortgage loans and contracts and direct investments, divided by mortgage loans and contracts.

TNWA = proxy variable for solvency and a measure of capital adequacy. *TNWA* is *TNW* divided by total book assets.

Empirical Tests of the Forbearance Hypothesis

To test the forbearance hypothesis, we use the Statistical Market-Value Accounting Model (SMVAM) of Unal and Kane (1987):

(1) $MKTVAL = U_e + kTNW + e$.

Equation 1 is the basic SMVAM regression where *MKTVAL* is the value of the thrift's stock and *TNW* is the book value of the thrift's equity. Unal and Kane interpret the slope coefficient, k, as the market's value of $1 of book equity, and U_e as the market's value of unbooked equity. In other words, k times *TNW* is the portion of market value accounted for by assets-in-place, and U_e is the portion of market value accounted for by the charter.

If booked assets and liabilities are marked-to-market, then the theoretical value of k is one; and if all assets and liabilities are carried on the books, the theoretical value of U_e is zero. If the charter value net of FSLIC forbearances and guarantees is positive (negative), FSLIC forbearances and guarantees will increase (decrease in absolute value terms) the size of U_e.

Equation 1 is estimated over the cross-section of firms in the sample for each quarter. As seen in table 1, U_e is positive in every

Proportion of Stock-Market Value Explained by Charter Value[a]

Quarter		Number	U_e /MKTVAL[b]	T-Bill[c]	GNMA[d]
1984	1	43	0.35454	0.0952	0.1270
	2	43	0.33716	0.0987	0.1414
	3	43	0.26789	0.1037	0.1308
	4	43	0.16006	0.0806	0.1254
1985	1	43	0.12509	0.0852	0.1268
	2	43	0.10347	0.0695	0.1154
	3	43	0.20564	0.0710	0.1129
	4	43	0.13311	0.0710	0.1070
1986	1	43	0.13173	0.0656	0.0944
	2	43	0.25091	0.0621	0.0957

a. Charter value is measured by the intercept term, U_e, in the SMVAM regressions.
b. *MKTVAL* is the average stock-market value of the firms in the sample.
c. Annual equivalent yield on 3-month Treasury bills traded on the secondary market (from Interest Rates tables in selected *Federal Reserve Bulletins*, 1984-1986).
d. Average net yields on Government National Mortgage Association, mortgage-backed, fully modified pass-through securities, assuming 12-year prepayment on 30 pools of FHA/VA mortgages (from Interest Rates tables in selected *Federal Reserve Bulletins*, 1984-1986).
SOURCE: Author.

TABLE 2

quarter. However, it is not significantly different from zero in five of the 10 quarters. Table 2 shows the percent of stock-market value accounted for by the estimated charter value, U_e. The value of the charter, which includes the FSLIC forbearances, ranges from a high of 35.4 percent in the first quarter of 1984 to a low of 10.3 percent in the second quarter of 1985. In other words, the charter is a nontrivial component of stockholder equity.

The per-dollar value the market places on book equity, k, appears in the sixth column in table 1. This value ranges from a low of 40 cents on the dollar in the second quarter of 1984 to a high of 82 cents on the dollar in the first quarter of 1986. In all quarters, k is positive and significantly different from one at the 1 percent level. As expected, there appears to be an inverse relationship between k and the level of interest rates. The general upward trend in k from the first quarter of 1984 to the second quarter of 1986 coincides with the downward trend in interest rates over this period.

Table 3 presents the results of joint tests of the SMVAM coefficients and tests of pooling restrictions. A seemingly unrelated system of equations, with each quarter estimated as a separate regression, is used to perform the tests. We reject the joint restriction that U_e is zero in every equation at the 1 percent level, but we cannot reject the restriction that U_e is equal across equations. For the slope coefficient, k, we reject both the cross-equation equality restriction and the joint restriction that k equals one in every quarter at the 1 percent level. Overall, the results of the joint tests and the pooling restrictions support the forbearance hypothesis.

Although the results of the SMVAM regressions are consistent with the forbearance hypothesis, the SMVAM specification does not provide a direct test of the forbearance hypothesis. Recall that a thrift charter may have value exclusive of deposit insurance subsidies and forbearances because the charter also contains the net value of all unbooked assets and liabilities. Moreover, estimates of U_e could be positive and significant when the value of FSLIC forbearances and guarantees is zero. Estimated U_e could be insignificant (or negative and significant) when the value of FSLIC forbearances and guarantees is positive and significant.

Pooling and Cross-Equation Equality Restrictions for the SMVAM Regressions[a]

Test: $U_{e1} = 0, U_{e2} = 0, \ldots\ldots, U_{e10} = 0$
$F(10,410) = 5.3392896^{\dagger}$

Test: $U_{e1} = U_{e2} \ldots\ldots = U_{e10}$
$F(9,410) = 0.62610870$

Test: $k_1 = 1, k_2 = 1, \ldots\ldots, k_{10} = 1$
$F(10,410) = 102.89425^{\dagger}$

Test: $k_1 = k_2 = \ldots\ldots = k_{10}$
$F(9,410) = 8.4505921^{\dagger}$

a. SMVAM Regression Model: $MKTVAL = U_e + kTNW + e$.
† Significant at the 1% level.
SOURCE: Author.

TABLE 3

Results from the MSMVAM Regressions[a]
(Using GAAP Net Worth[b])

Quarter		U_e	k	β_1	β_2	β_3	R^2
1984	1	1395.67	0.40942†	-19394.22	109864.88††	124226.48	0.8493
		(0.193)[c]	(17.592)	(-0.721)	(4.318)	(1.483)	
	2	12627.61	0.42172†	-66681.97*	49812.35*	96534.29	0.7649
		(1.302)	(13.652)	(-2.175)	(1.934)	(0.798)	
	3	4231.84	0.46008†	-40394.91	27471.48	190151.80	0.7806
		(0.388)	(11.881)	(-1.122)	(1.094)	(1.345)	
	4	-5007.80	0.53010†	-25806.27	7272.61	320283.78*	0.8080
		(0.454)	(9.679)	(-0.775)	(0.262)	(2.021)	
1985	1	-4171.15	0.62986†	-2115.69	-43843.94	303247.14**	0.8610
		(-0.383)	(7.879)	(-0.065)	(-1.508)	(1.941)	
	2	-8187.52	0.70668†	15703.69	-44814.60	337791.44**	0.8575
		(-0.597)	(5.408)	(0.398)	(-1.443)	(1.751)	
	3	-8847.13	0.55141†	8946.48	-30860.57	443532.27*	0.8178
		(-0.645)	(9.093)	(0.238)	(-0.874)	(2.413)	
	4	-23639.28	0.67333†	8533.00	23836.61	599654.62*	0.8097
		(-1.265)	(5.129)	(0.177)	(0.514)	(2.374)	
1986	1	-30194.55	0.77275†	35213.95	35936.96	681527.26*	0.8425
		(-1.464)	(3.332)	(0.618)	(0.618)	(2.417)	
	2	26518.43	0.75192†	73120.49	-189767.15*	76236.99	0.7293
		(1.073)	(2.758)	(0.849)	(-2.131)	(0.253)	

a. Model: $MKTVAL = U_e + kTNW + \beta_1 LIQ + \beta_2 DIV + \beta_3 TNWA + e$.
b. Net worth computed using generally accepted accounting procedures.
c. T-statistics in parentheses.

† Significantly different from one at 1%.
†† Significantly different from zero at 1%.
* Significantly different from zero at 5%.
** Significantly different from zero at 10%.

SOURCE: Author.

TABLE 4

A careful reexamination of the results in tables 1 and 2 indicates that the positive sign on U_e in every quarter is due, at least in part, to the positive value of FSLIC guarantees and forbearances. There is an inverse relationship between k and $U_e/MKTVAL$. As the the market value of book equity increases, charter value as a percent of *MKTVAL* decreases. The value of forbearances and guarantees should be inversely related to k.

On the other hand, the value of the charter exclusive of FSLIC forbearances and guarantees is expected to be positively correlated with k. This suggests that FSLIC forbearances and guarantees are a large enough portion of U_e that changes in their value dominate the pattern of U_e across quarters.

To test the forbearance hypothesis more directly, we modify equation 1 to include the variables *LIQ, DIV,* and *TNWA* to proxy for FSLIC forbearance policy:

$$(2) \quad MKTVAL = U_e + kTNW + \beta_1 LIQ + \beta_2 DIV + \beta_3 TNWA + e.$$

The first forbearance proxy, *LIQ,* measures liquidity. Because the closing of an insolvent institution is an event timed by the regulators, insolvency is a necessary, but not sufficient, condition for the forced closing of a thrift by its regulator. Given the growing insolvency of the FSLIC insurance fund and the large number of market-value and book-value insolvent thrifts (see Barth, et al. [1985] and U.S. General Accounting Office [1987]), the liquidity of the thrift affects the probability that FSLIC forbearances will be extended to stockholders.

Insolvent thrifts (those that are not running up large losses) tend to be closed when illiquid, especially when they are insolvent according to market-value accounting, but not book-value accounting. Ceteris paribus, the more liquid the thrift, the less likely a liquidity crisis will cause the FHLBB to close the thrift. Therefore, the value of FSLIC forbearances should be positively related to liquidity. By construction, as *LIQ* increases, the thrift's liquidity decreases. Consequently, β_1 should have a negative sign.

The second forbearance proxy, *DIV,* is a measure of diversification in the asset portfolio. *DIV* includes both direct investments and nonmortgage loans and contracts. In March 1985, the FHLBB issued a formal regulation that restricted direct investments to less than the minimum of 10 percent of total assets and twice the amount of capital. This regulation, which was in effect

Pooling and Cross-Equation Equality Restrictions for the MSMVAM Regressions[a]

Test: $U_{e1} = 0, U_{e2} = 0, \ldots\ldots, U_{e10} = 0$
$F(10,380) = 0.5559142$

Test: $U_{e1} = U_{e2} \ldots\ldots = U_{e10}$
$F(9,380) = 0.61687062$

Test: $k_1 = 1, k_2 = 1, \ldots\ldots, k_{10} = 1$
$F(10,380) = 90.82540^{\dagger}$

Test: $k_1 = k_2 = \ldots\ldots = k_{10}$
$F(9,380) = 6.8009228^{\dagger}$

Test: $\beta_{1,1} = 0, \beta_{1,2} = 0, \ldots\ldots, \beta_{1,10} = 0$
$F(10,380) = 0.98109793$

Test: $\beta_{1,1} = \beta_{1,2} = \ldots\ldots = \beta_{1,10}$
$F(9,380) = 0.82046518$

Test: $\beta_{2,1} = 0, \beta_{2,2} = 0, \ldots\ldots, \beta_{2,10} = 0$
$F(10,380) = 2.8303445^{*}$

Test: $\beta_{2,1} = \beta_{2,2} = \ldots\ldots = \beta_{2,10}$
$F(9,380) = 2.8692565^{*}$

Test: $\beta_{3,1} = 0, \beta_{3,2} = 0, \ldots\ldots, \beta_{3,10} = 0$
$F(10,380) = 2.9404988^{*}$

Test: $\beta_{3,1} = \beta_{3,2} = \ldots\ldots = \beta_{3,10}$
$F(9,380) = 0.98635699$

a. MSMVAM Regression Model:
$MKTVAL = U_e + kTNW + \beta_1 LIQ + \beta_2 DIV + \beta_3 TNWA + e.$
† Significant at the 1% level.
* Significant at the 5% level.
SOURCE: Author.

TABLE 5

throughout the remainder of the sample period, applies only to nationally chartered thrifts, and not to the FSLIC-insured, state-chartered thrifts.

The FHLBB is strongly opposed to direct investments by thrifts because it believes such investments increase the losses to the FSLIC fund when an insolvent thrift is closed (see Benston [1986]). Therefore, we expect there to be an inverse relationship between FSLIC forbearances and the level of direct investment. Given the FHLBB's policy regarding direct investment and its policy statements emphasizing mortgage lending during this period, β_2 should be negative in the sample period from March 1985 on. Conversely, *DIV* could also be a proxy for management quality.[9] That is, the market may view a decrease in the thrift's reliance on mortgages as an indication of the quality of management. This diversification (management quality) explanation would make β_2 positive before March 1985. After that time, the sign of β_2 should be negative if the forbearance hypothesis holds.

The third forbearance variable, *TNWA*, proxies for solvency. Note that *TNWA* is solvency measured by book, not market, values. This means that a thrift with positive *TNWA* could be insolvent on a market-value basis.[10] The value of deposit-guarantor forbearances depends on market solvency, not on *TNWA*. On the other hand, the probability of forbearance is a function of *TNWA*. FHLBB-mandated capital requirements (*TNWA* of 3% or more) are based on book values. FSLIC forbearances are extended to any institution that meets the minimum capital guidelines, and they may be extended to institutions with deficient capital ratios. Therefore, we use *TNWA* as our proxy for solvency because the probability of forbearance is a positive function of *TNWA*. The sign on β_3 should be positive.

The results from the regressions on equation 2 are reported in table 4. Joint tests of the regression coefficients and pooling tests for the small sample appear in table 5. For all quarters, the estimates of U_e are not significantly different from zero in the modified SMVAM (MSMVAM) regressions. In fact, we cannot reject the joint restriction that U_e is zero in every quarter or the cross-equation equality restriction on U_e. In the SMVAM regressions, estimated U_e is significantly different from zero in five of the 10 quarters, and we reject the joint restriction that U_e is zero.

However, k estimates are not affected by the inclusion of the forbearance proxies. Estimated k is positive and significantly less than one in every quarter, and we cannot reject the restriction that $k_{SMVAM} = k_{MSMVAM}$ in any quarter. Furthermore, both the joint test that k equals one in every quarter and the cross-equation equality restriction on k are rejected at the 1 percent level for both the SMVAM and the

9 In economics, we assume that management is a scarce resource. Therefore, firms with high-quality management will have a higher market value than firms with lower-quality management. This, of course, assumes that the market for managerial talent is not perfectly competitive.

10 The difference between market-based and accounting-based measures of solvency can be quite large. A *TNWA* of 3 percent is often used as a proxy for the solvency threshold on a market-value basis.

MSMVAM regressions. The difference (similarity) in the behavior of U_e (k) between the SMVAM and the MSMVAM regressions is consistent with the forbearance hypothesis.

The coefficients on the forbearance proxies themselves present a mixed set of conclusions. The coefficient on *LIQ*, β_1, is negative and significant in the second quarter of 1984, supporting the forbearance hypothesis. However, β_1 is not significantly different from zero in any other quarter, and we cannot reject the joint restriction that β_1 equals zero in every quarter. Therefore, the overall performance of β_1 does not provide strong support for the forbearance hypothesis.[11] The poor performance by *LIQ* may be due in large part to sample selection bias. The thrifts in this sample are the largest in the industry and are likely to have greater access to national capital markets, and therefore greater sources of liquidity, than the average thrift in the population.

The results for the diversification (management quality) variable, *DIV*, are also mixed. β_2 is positive and significant in the first two quarters of 1984 and negative and significant in the second quarter of 1986. Moreover, β_2 is positive in six of the 10 quarters in table 4. The cross-equation equality restriction on β_2 and the joint restriction that β_2 is zero in every equation are both rejected at the 5 percent level.

On the surface, the seemingly conflicting evidence provided by DIV seems to refute the forbearance hypothesis. But a closer inspection of the results indicates that this is not the case. Recall that the FHLBB policy restricting direct investment did not go into effect until the first quarter of 1985. Therefore, the positive and significant (insignificant) β_2's in the first (second) two quarters of 1984 are consistent with both the management-quality hypothesis and the forbearance hypothesis.

Moreover, in table 4, β_2 is positive but not significant twice, and negative and significant once, after the FHLBB took a stand against direct investment and against diversification of the asset portfolio away from mortgage-based assets. In fact, if we split the sample according to this policy change, we cannot reject the cross-equation equality restriction on β_2 in the pre- and post-policy change periods. However, in the first period we reject the joint restriction that β_2 equals zero at the 1 percent level, but we cannot reject it in the second period.

Of all of the forbearance proxies, *TNWA*, the solvency proxy, provides the strongest evidence supporting the forbearance hypothesis.[12] β_3 is positive in every quarter and is significant in six quarters. The significance of β_3 in every quarter from the last quarter of 1984 through the first quarter of 1986 coincides with the time period when the FSLIC fund was shrinking as a result of massive losses in the thrift industry (see U.S. General Accounting Office [1987] and Barth, et al. [1985]). The joint restriction that β_3 equals zero in every equation is rejected at the 5 percent level. However, we cannot reject the cross-equation equality restriction on β_3.

Even though the results were somewhat disappointing when we look at the forbearance proxies individually, the overall results are encouraging. Looking at table 4, we see that in every quarter except the third quarter of 1984, U_e is not significantly different from zero, and at least one of the forbearance proxies is significantly different from zero and correctly signed. Moreover, we obtain these results using a sample that is likely to be biased against supporting our maintained hypothesis. That is, our sample is drawn from the largest firms in the industry, and it is likely that we undersample the part of the industry for whom the FSLIC forbearance policy has the most value.

IV. Conclusions and Policy Implications

Deposit-insurance guarantees and forbearances have value. The value of FSLIC deposit guarantees and forbearances is reflected in the market value of thrift institution stocks. Proxies for FSLIC forbearances and forbearance policy are shown to be related to thrift charter values. The empirical results of this paper support Kane's (1986) argument that FSLIC forbearances and guarantees are an increasingly important source of thrift charter value. Our results also support Thomson's (1987) theoretical result that the extension of forbearances to stockholders of insolvent institutions increases the value of stockholders' equity.

Because deposit-insurance forbearances to stockholders increase the value of the stockholders' position in the firm at the expense of the federal deposit guarantor, and ultimately the federal taxpayer, the federal deposit-insurance agencies should always close out the position of the stockholders when reorganizing insolvent institutions. Capital forbearance programs, such as those utilized by the FHLBB in dealing with thrift insolvencies and those being used by bank regulators for agricultural and energy lenders, result in a bailout of deposit institutions' stockholders by the federal taxpayer. Our results support the concept of the management consignment program currently used by the FHLBB to reduce the unintended

11 The poor performance of the liquidity proxy was not due to proxy variable construction. Similar results were obtained with other specifications of *LIQ*.

12 Although *TNWA* is *TNW* scaled by total book assets, there is almost no correlation between *TNWA* and *TNW* for any of the quarters in either sample.

value of deposit-insurance subsidies. However, our results also indicate that the FDIC should rethink its capital forbearance and open-bank assistance policies, unless the bailouts of existing managements and shareholders of failed and failing banks are the intended results of those policies.

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