

# Projecting Suburban Office Space Demand: Alternative Estimates of Employment in Offices

Marie Howland\*  
David S. Wessel\*\*

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*Abstract.* The boom-bust cycle of the 1980s highlights the need for independent, public sector estimates of office space needs. Buildings that fail to yield full property tax revenues, stand vacant and discourage development in the surrounding environment, displace jobs without creating new ones, and merely succeed in luring tenants from older buildings, have become commonplace in the real estate bust of the late 1980s and early 1990s.

The purpose of this paper is to estimate office space demand and show patterns of office space usage in a suburban county. Specifically, we estimate the share of employees in free-standing offices, by empirically observing the share of industry employment in offices in 1986. We then assess the accuracy of our values and compare our results with an alternative, occupational approach. The data is drawn from Prince George's County, Maryland, a suburban county of Washington, D.C.

To briefly summarize findings, our empirically based, industry-specific approach indicates there is a changing and wide variation in the share of employment in free-standing office buildings across the two-digit service industries. However, when data are aggregated across all service industries, our results generate estimates of office employment comparable to the earlier occupational approach of Kimball and Bloomberg (1987). Both approaches produce office space demand projections within 9% to 12% of actual leased space.

## Previous Research

Researchers have applied both econometric and judgmental methods to the task of estimating office demand. Econometric methods predict changes in office space demand as a time-series function of such variables as local employment growth, vacancy rates, and rents (e.g., Rosen, 1984; Hekman, 1985; Wheaton, 1987; McClure, 1991). In contrast, judgmental office models estimate demand by first disaggregating office occupancy by local industrial sectors at a fixed point in time and then projecting industry growth (Alexander, 1979; Kelly, 1983; Kimball and Bloomberg, 1987). The accuracy of judgmental models is highly dependent upon assumptions about office use across industrial sectors.

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\*Urban Studies and Planning Program, University of Maryland at College Park, 1117 Lefrak Hall, College Park, Maryland 20742.

\*\*Southeast Idaho Council of Governments, 280 South Arthur, Pocatello, Idaho 83204.

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For example, Kelly (1983) projected demand for office space in New York City by assuming that all of Manhattan's white-collar workers locate in primary office buildings. Kelly obtained data on the share of each industry's employment in white-collar jobs from New York State's *Occupational Employment Survey*. Kimball and Bloomberg (1987) estimated office demand by first predicting the share of industry employment in white-collar jobs, using national occupational data by major industry sector. Drawing on the New York Regional Plan, Kimball and Bloomberg (K&B) estimated one-third of all white-collar jobs are found outside free-standing office buildings (Armstrong, 1972, p. 20), leaving 2.6% of agriculture, 18.8% of mining, 14.6% of construction, 17% of manufacturing, 30.2% of transportation, 16.8% of wholesale and retail trade, 59% of finance, insurance and real estate (FIRE), and 19% of all service workers based in office buildings.

These applications of judgmental models suffer from several shortcomings. First, estimates of the share of each industry's employees who are white-collar workers are based on central city data in the Kelly model and national data in the K&B model, and therefore may not be generalizable to the suburbs.

Second, the Kelly model assumes all white-collar workers are housed in primary office buildings, an assumption that may be realistic for central cities, but not suburbs. K&B draw their estimates of the share of white-collar workers in offices from the New York metropolitan region in the early 1970s. While these estimates may hold for the wider New York metropolitan area, they may not apply outside New York or they may be outdated. Central city/suburban and cross-metropolitan differences in land costs and zoning restrictions are just two factors that would result in regional differences in the share of white-collar occupations situated in office buildings. Our approach bypasses these shortcomings by directly estimating the share of industry employees in free-standing office buildings.

Third, the K&B estimates are highly aggregated by industry and may lose their accuracy when applied to small, less heterogeneous economies. The advantages of our approach are its empirical base, its suburb-specific application, and its finer, two-digit Standard Industrial Classification (SIC) code level. It further provides a validity check for the widely used K&B estimates.

## Context

We use Prince George's County, Maryland as an archetype. Prince George's County surrounds the eastern boundary of Washington, D.C., and is suitable for analysis because of its large area, 487 square miles; population, more than 730,000 residents; and employment, 250,000 jobs. Moreover, the county's service economy is highly diversified, with all but two, two-digit service industries represented.<sup>1</sup>

An industry's share of employment in office space is influenced by economic structure, land values, zoning and height restrictions, and infrastructure investments, such as fixed rail transit, freeways and beltways. Economies that include a complex constellation of business and financial services are more likely to attract headquarters, which are more likely than branches to locate in office space. Prince George's County has a well-developed service sector, with 81% of this county's employment in services,<sup>2</sup> including wholesaling and retailing. Land values in Prince George's County

are high relative to the nation and low relative to the rest of the metropolitan area. In 1990, the average lease rates were \$16.53 per square foot, compared to \$20.63 in Montgomery County and \$30.31 for the District of Columbia. High land costs encourage office development.

Although Prince George's land values are below those of neighboring suburban Montgomery County, more stringent planning restrictions and a shortage of developable sites in neighboring Montgomery County pushed both employment and office growth to Prince George's County during the 1980s. Finally, office density in Prince George's County has been further encouraged by the existence of a beltway and five Metro stations, which increase accessibility to downtown and the rest of metropolitan Washington.

## Methodology

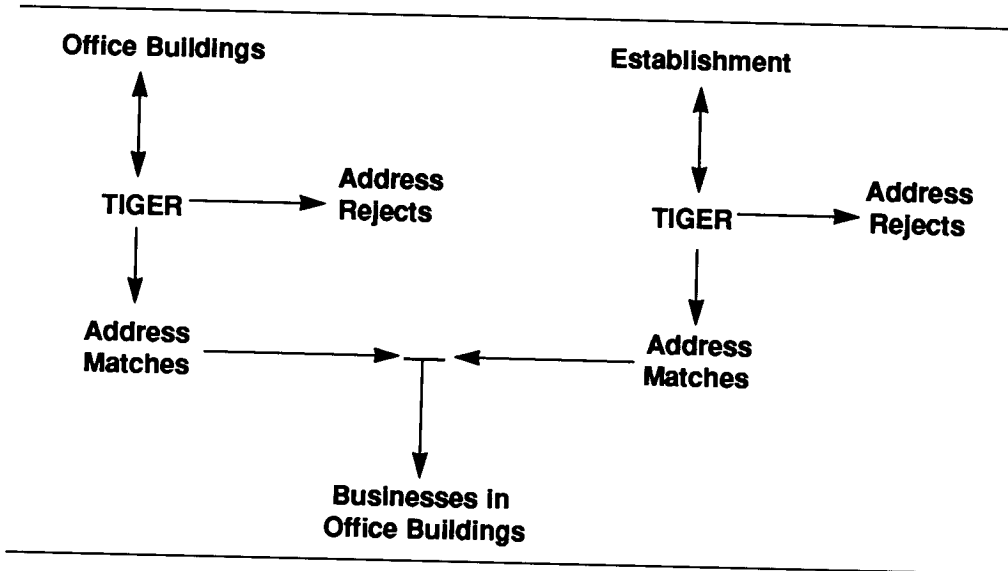
We estimate the percent of industry employment located in offices by matching a database of establishments with an office space database and determining the share of industry employment located in offices. The establishment data is extracted from the United States Establishment and Enterprise Microdata (USEEM) file, obtained from the Small Business Administration.<sup>3</sup> This database includes nearly 100% of Prince George's County establishments and employment in SIC codes 40 through 89 for the years 1980 and 1986.<sup>4</sup> The number of employees at that location and the exact street address are reported for each record.

The source of the office space inventory is the *Survey of Office Space in Prince George's County* (1990) collected by the Prince George's County Department of Economic Development. This inventory includes all 1986 and 1989 free-standing total, leased, and vacant office space in buildings larger than 10,000 square feet. These office buildings include mixed uses, such as retail and flex/tech space. Buildings that *have the potential* to be 100% office are included in the flex/tech office building category. By relating these two databases by common address field, we identified those businesses and the number of employees located within office buildings.

Prior to merging the two data sets, efforts were undertaken to correct and standardize addresses. The TIGER (Topologically Integrated Geographic Encoding and Referencing) file served as the common base for address formatting. The TIGER file is a computer-based map that locates street addresses and other geographical attributes in space, in this case for Prince George's County. In separate runs, establishments from the USEEM file and office buildings were first mapped onto the TIGER file. Examples of the results are shown below. We used Arc/INFO, a geographic information system (GIS) software package to match addresses and produce final maps. During the initial matches, errors in the address fields of the establishment file, office space database, and the TIGER file surfaced. The process by which we related the data sets using the GIS is charted here.

Recognizing the importance of increasing our percentage of address matches to provide reliable estimates, we added missing street names and address ranges to the TIGER file in and around the Capital Beltway, a prime area for office location. In addition, we reviewed rejected addresses in both the office space and establishment databases, corrected problems with format and spelling in all office building addresses

## Exhibit 1



and in reoccurring establishment and TIGER data sets, and ran the address match again. These efforts yielded a 77% match rate between businesses and TIGER and a 100% match rate between office buildings and TIGER.<sup>5</sup> The subsequent establishment/office space merge yielded a 12% match, a percentage consistent with the notion that a majority of establishments do not operate out of large office buildings. Exhibit 2 shows the location of offices buildings across the county, and Exhibit 3 demonstrates the location of finance, insurance and real estate establishments. Establishments in all industries are not shown because the exhibit becomes congested and unreadable at this scale.

The rejects from the establishment/TIGER match may either result from faulty establishment addresses or defective, out-of-date, or missing TIGER addresses. Predictable biases occur in the final estimates of the share of employment in office space.

The correct values for the share of industry employment in offices  $[a_i]$  range from:

$$a_i = [(o_i/x_i + y_i)] \quad (1)$$

to

$$a_i = [(o_i/y_i) * (x_i) + o_i]/(x_i + y_i), \quad (2)$$

where

- $o$  = number of employees in offices,
- $y$  = total county employees in matched set,
- $x$  = total county employees in reject set,

subscript  $i$  = industry.

Equation (1) measures the lower bound estimates, which assumes that all rejects of the establishment/TIGER match are due to faulty TIGER addresses and outside of offices. Since all TIGER addressees under office buildings have been corrected, we should have captured all county establishments located in office buildings in the event the address errors lie with the TIGER file.

Equation (2) measures the upper bound values and is based on the assumption that all rejects are due to defective establishment addresses, and that the reject set has the same share of employment in offices as the matched set.

The true number is most likely between the two possibilities, however, the share of rejects due to defects in the TIGER versus the establishment file is unknown. The final office space projections in the text use equation (1), the lower bound estimates of the share of employees in offices. The results from equation (2), the upper bound estimates are presented in Appendix 1. Both the upper and lower bound estimates are compared in Exhibit 4. For most industries the lower and upper bound values differ only slightly, with the upper bound values generating larger estimates of overall office demand by about 4%.

Exhibit 5 compares lower bound estimates for both 1980 and 1986. Although the 1980 figures are not used to project office space, we analyze these data and draw on the results to explore and test for reliability of the 1986 figures.

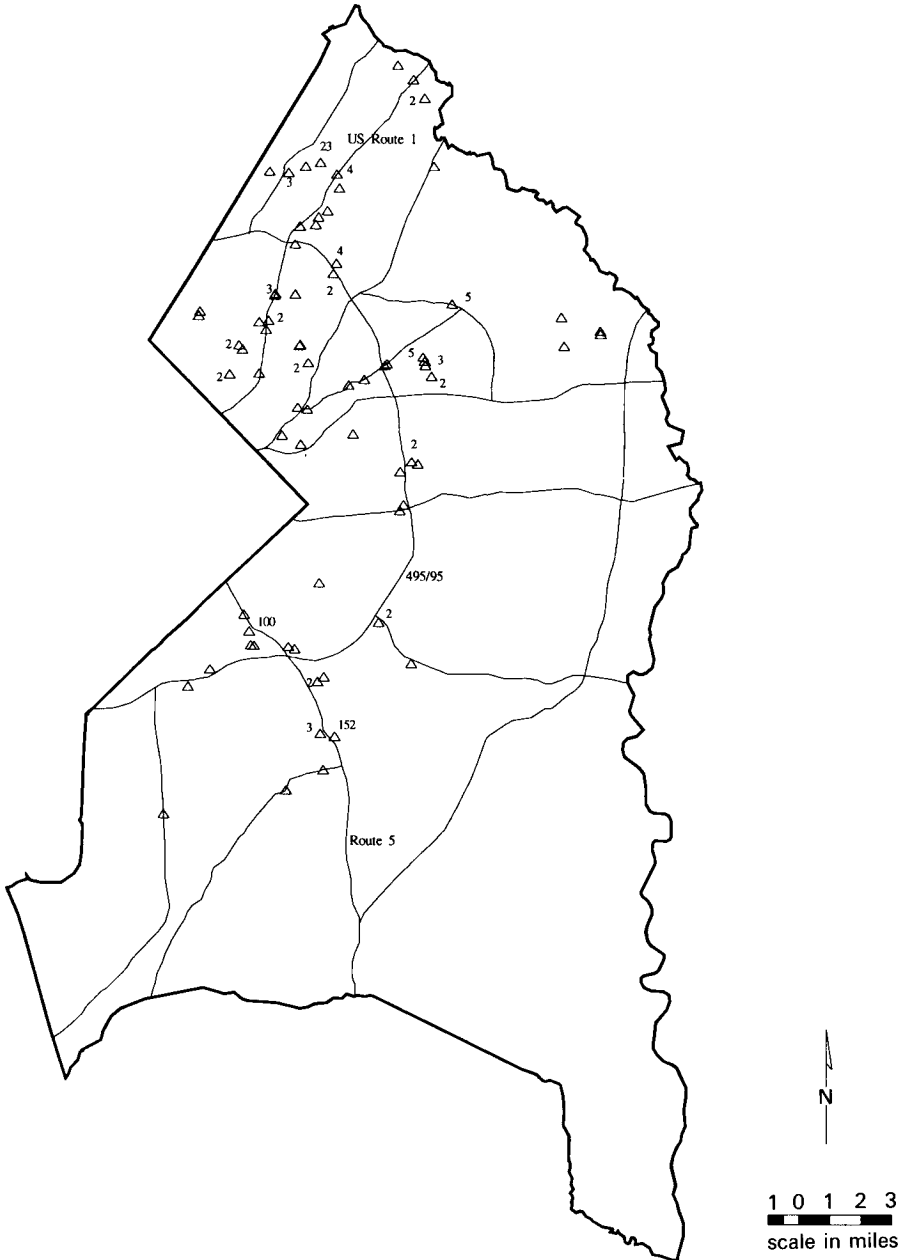
Ten of the thirty-eight SIC codes had an absolute 1986–1980 difference greater than 10% (Exhibit 5). Of these, four SIC categories including 45, 48, 62, and 63, suffered from a small establishment base in 1980, and therefore unavailable, unstable, or unreliable 1980 estimates. The other large changes can be explained by the dynamics of the economy and heterogeneity within two-digit SIC categories. Between 1980 and 1990, Prince George's County grew by 9.7%, nearly 60,000 people (U.S. Census, 1991). This population growth resulted in structural changes in a number of industries. Within transportation services (SIC 47), most growth occurred in (SIC 472) "passenger travel arrangements" or travel agents. The number of travel agents increased by 25% between 1980 and 1986, and it is reasonable to believe these new establishments located in office buildings.

Although the number of county banking employees (SIC 60) declined slightly between 1980 and 1986, the number of banking establishments grew from 88 to 140. The small size of these establishments (91% have less than nineteen employees), and their dispersal throughout the county, suggest the growth is attributable to new branch banks located in residential commercial centers. Thus, the share of banking employment in office space declined.

SIC 79, amusement and recreation services, also appears to have dramatically increased its share of employment in office space. A finer disaggregation of this industry shows particularly large employment increases in membership sports and recreation clubs. Since a high proportion of health clubs locate in free-standing office buildings, the 1980 to 1986 increase in the share of total employment in offices is plausible. While for most industries there is stability in the proportion of office workers over time, these 1980 to 1986 discrepancies highlight some of the costs of inadequate industrial detail.

As one might expect, the transportation, wholesale, retail and services sectors of the economy are generally low in their percentages of office-based employees. The greatest proportion of office-based employment is found in the finance, insurance and real

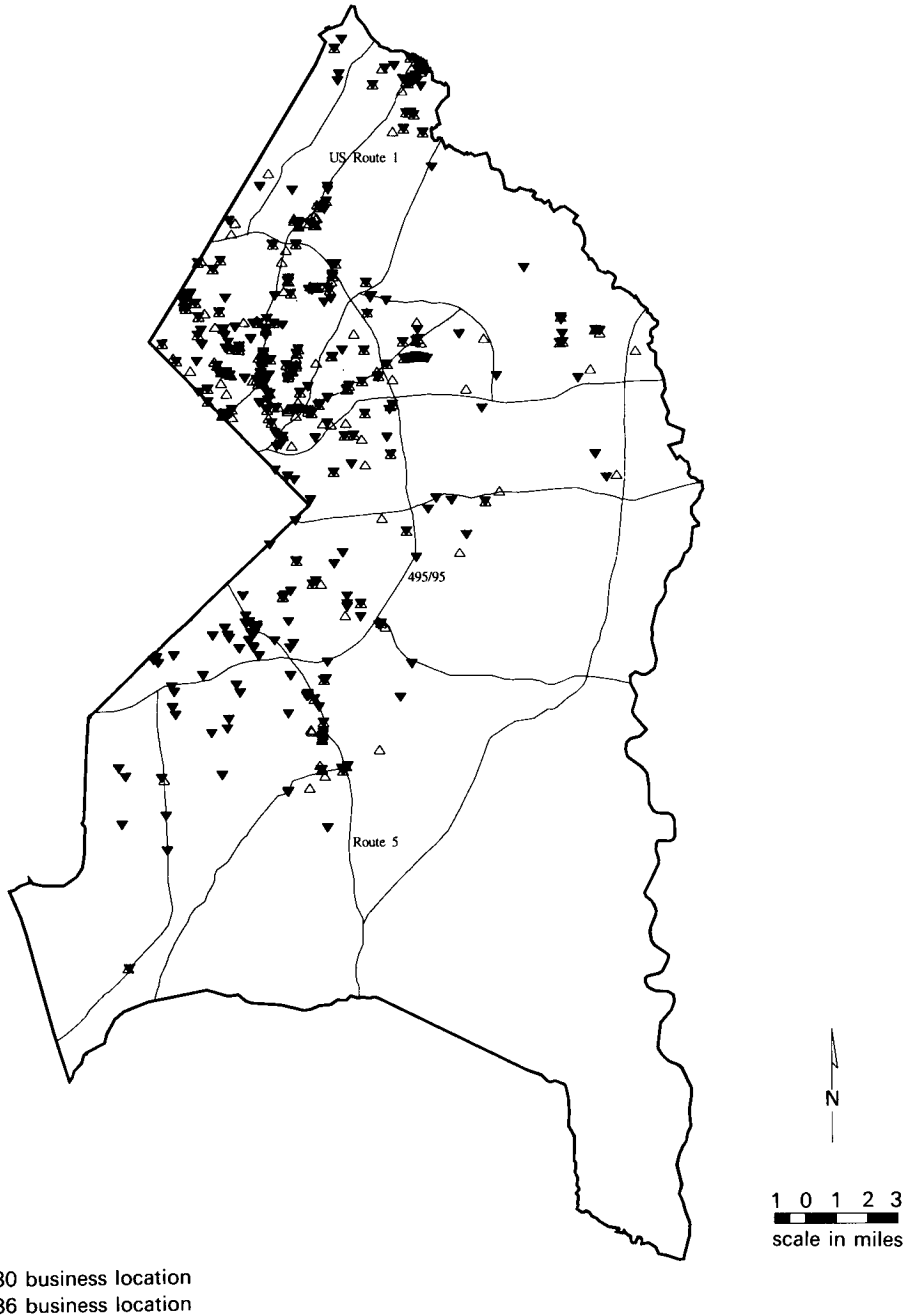
### Exhibit 2 Office Buildings, Prince George's County, Maryland, 1986



△ Office buildings: Total Office Buildings=380; triangles with numbers refer to a cluster of office building addresses.

Source: UMCP Urban Studies and Planning Department

### Exhibit 3 Location of Finance, Insurance and Real Estate Establishments, Prince George's County, Maryland



Source: UMCP Urban Studies and Planning Department

**Exhibit 4**  
**Share of Employees Located in Office Buildings, Lower and**  
**Upper Bound Estimates**

Industry Name	SIC code	Lower bound	Upper bound
TCU, Local Passenger Rail	41	6.1	6.3
TCU, Trucking Warehousing	42	.9	1.9
TCU, Water Transportation	44	.0	.0
TCU, Transportation by Air	45	19.6	60.6
TCU, Transportation Services	47	63.3	65.3
TCU, Communication	48	52.1	59.8
TCU, Electric, Gas, Sanitary	49	.0	.0
Wholesale Trade, Durable Goods	50	10.7	14.6
Wholesale Trade, Nondurable Goods	51	6.4	7.7
Retail Trade, Bldg. Materials	52	2.5	3.2
Retail Trade, General Merchandise	53	5.3	8.5
Retail Trade, Food Stores	54	.1	.1
Retail Trade, Auto Dealers/Serv. Stations	55	.2	.2
Retail Trade, Apparel Accessories	56	2.0	2.6
Retail Trade, Furniture, Furnishings	57	1.3	1.6
Retail Trade, Eating, Drinking	58	2.6	3.6
Retail Trade, Miscellaneous	59	2.4	3.0
F.I.R.E., Banking	60	23.0	29.8
F.I.R.E., Credit Agencies	61	54.6	65.3
F.I.R.E., Security, Commodity	62	14.7	23.7
F.I.R.E., Insurance Carriers	63	80.3	83.4
F.I.R.E., Insurance Agents, Brokers	64	36.8	42.1
F.I.R.E., Real Estate*	65/66	27.0	32.1
F.I.R.E., Holding, Other Investments	67	31.4	45.7
Services, Hotels, Other Lodgings	70	13.6	18.4
Services, Personal	72	4.7	5.6
Services, Business	73	37.1	52.6
Services, Auto Repair, Garage	75	.3	.4
Services, Miscellaneous Repair	76	17.9	20.8
Services, Motion Pictures	78	4.7	6.0
Services, Amusement, Recreation	79	27.4	42.7
Services, Health	80	7.6	8.1
Services, Legal	81	37.9	48.0
Services, Educational	82	.7	.8
Services, Social	83	20.7	24.8
Services, Museums, Gardens	84	.0	.0
Services, Membership Organizations	86	32.1	40.2
Services, Miscellaneous	89	30.8	34.1

\*SICs codes 65 and 66 were combined because of the small number of establishments in SIC 66—Combined Real Estate and Insurance establishments.

Source: United States Establishment and Enterprise Microdata file, 1986, and the Prince George's County, Department of Economic Development, 1990



**Exhibit 5**  
**Comparison of Share of Employment in Office Buildings by Industry Lower Bound Values, 1980 and 1986**

SIC code	Number of establishments	1980 Total employed	1980 No. employed in office	1980 Percent employment in office	1986 Percent employment in office	Difference in percent 1986-1980
TCU, Local Passenger Rail	21	366	0	0	6.1	6.1
TCU, Trucking, Warehousing	147	3,362	30	.9	.9	.0
TCU, Water Transportation	1	2	0	.0	.0	.0
TCU, Transportation by Air	3	50	0	.0	19.6	19.6
TCU, Transportation Services	24	159	12	7.5	63.3	55.8
TCU, Communication	8	106	39	36.8	52.1	15.3
TCU, Electric, Gas, Sanitary	13	452	0	.0	.0	.0
Wholesale Trade, Durable Goods	465	5,818	585	10.1	10.7	.7
Wholesale Trade, Nondurable Goods	201	4,989	166	3.3	6.4	3.0
Retail Trade, Bldg. Materials	86	1,291	20	1.5	2.5	.9
Retail Trade, General Merchandise	31	1,940	171	8.8	5.3	-3.6
Retail Trade, Food Stores	78	10,205	160	1.6	.1	-1.5
Retail Trade, Auto Dealers, Serv. Stations	290	4,090	10	.2	.2	.0
Retail Trade, Apparel, Access	119	2,240	16	.7	2.0	1.3
Retail Trade, Furniture, Furnishings	179	1,494	86	5.8	1.3	-4.4
Retail Trade, Eating, Drinking	293	5,187	295	5.7	2.6	-3.1
Retail Trade, Miscellaneous	504	5,484	158	2.9	2.4	-.5
F.I.R.E., Banking	88	2,569	1,803	70.2	23.0	-47.2
F.I.R.E., Credit Agencies	61	359	192	53.5	54.6	1.1
F.I.R.E., Security, Commodity	2	15	15	100.0	14.7	-85.3
F.I.R.E., Insurance Carriers	11	81	36	44.4	80.3	35.9
F.I.R.E., Insurance Agents, Brokers	64	364	97	26.6	36.8	10.1
F.I.R.E., Real Estate	345	3,843	656	17.1	9.9	-7.2
F.I.R.E., Holding, Other Investments	15	169	44	26.0	31.4	5.3
Services, Hotels, Other Lodgings	39	1,794	250	13.9	13.6	-.3
Services, Personal	189	15,300	79	.5	4.7	4.1
Services, Business	515	14,659	3,785	25.8	37.1	11.3
Services, Auto Repair, Garage	75	1,513	8	.5	.3	-.2
Services, Miscellaneous Repair	178	1,069	54	5.1	17.9	12.9
Services, Motion Pictures	14	269	0	0	4.7	4.7
Services, Amusement, Recreation	66	1,164	42	3.6	27.4	23.8
Services, Health	109	5,975	190	3.2	7.6	4.4
Services, Legal	46	332	150	45.2	37.9	-7.3
Services, Educational	82	3,095	5	.2	.7	.5
Services, Social	32	522	96	18.4	20.7	2.3
Services, Museums, Gardens	84	3	0	.0	.0	.0
Services, Membership Organizations	86	1,326	459	34.6	32.1	-2.5
Services, Miscellaneous	89	2,972	1,061	35.7	30.5	-5.2

Source: United States Employment and Establishment Microdata file, 1980 and 1986; Prince George's County Department of Economic Development (1990); TIGER file, 1990

**Exhibit 6**  
**Estimates of Private Sector Net New Office Space Demand, 1986 to 1989, Comparison with Kimball**  
**and Bloomberg Estimates**

Industry description	Two-digit SIC code	1980		1986		Projected net new 1989		Percent of office-based employees (K&B) <sup>c</sup>		Projected net new '89 space demand (K&B) <sup>d</sup>		Percent of office-based employees (MH&DW) <sup>e</sup>		Projected net new '89 space demand (MH&DW) <sup>f</sup>	
		Employment <sup>a</sup>	Employment <sup>a</sup>	Employment <sup>a</sup>	Employment <sup>a</sup>	net new 1989	Employment <sup>b</sup>	(K&B) <sup>c</sup>	(K&B) <sup>c</sup>	net new '89	(K&B) <sup>d</sup>	(MH&DW) <sup>e</sup>	(MH&DW) <sup>e</sup>	net new '89	(MH&DW) <sup>f</sup>
Agriculture, Agricultural Services	7	725	1,185	316	2.6	2.6	2,847	2.6	2,847	2.6	2,847	2.6	2,847	2.6	2,847
Mining, Nonmetallic Minerals	14	217	383	119	18.8	18.8	7,791	18.8	7,791	18.8	7,791	18.8	7,791	18.8	7,791
Construction, Gen. Building Contractors	15	3,101	4,177	653	14.6	14.6	33,107	14.6	33,107	14.6	33,107	14.6	33,107	14.6	33,107
Construction, Spec. Trade Contractors	17	13,306	21,077	5,228	14.6	14.6	264,885	14.6	264,885	14.6	264,885	14.6	264,885	14.6	264,885
Manufacturing, Apparel, Other Textiles	23	92	102	5	17.0	17.0	316	17.0	316	17.0	316	17.0	316	17.0	316
Manufacturing, Paper, Allied Products	25	384	619	160	17.0	17.0	9,429	17.0	9,429	17.0	9,429	17.0	9,429	17.0	9,429
Manufacturing, Printing, Publishing	27	2,949	3,831	523	17.0	17.0	30,874	17.0	30,874	17.0	30,874	17.0	30,874	17.0	30,874
Manufacturing, Stone, Clay, Glass	32	951	866	(40)	17.0	17.0	(2,354)	17.0	(2,354)	17.0	(2,354)	17.0	(2,354)	17.0	(2,354)
Manufacturing, Fabricated Metal Products	34	1,147	1,289	77	17.0	17.0	4,524	17.0	4,524	17.0	4,524	17.0	4,524	17.0	4,524
Manufacturing, Machinery except Electric	35	613	436	(70)	17.0	17.0	(4,138)	17.0	(4,138)	17.0	(4,138)	17.0	(4,138)	17.0	(4,138)
Manufacturing, Electric, Electronics	36	1,873	2,916	694	17.0	17.0	40,951	17.0	40,951	17.0	40,951	17.0	40,951	17.0	40,951
Manufacturing, Instruments, Related Pro	38	126	284	132	17.0	17.0	7,771	17.0	7,771	17.0	7,771	17.0	7,771	17.0	7,771
Manufacturing, Miscellaneous	39	128	209	56	17.0	17.0	3,276	17.0	3,276	17.0	3,276	17.0	3,276	17.0	3,276
TCU, Local Passenger Rail	41	375	317	(26)	30.2	30.2	(2,713)	30.2	(2,713)	30.2	(2,713)	30.2	(2,713)	30.2	(2,713)
TCU, Trucking, Warehousing	42	5,358	7,175	1,099	30.2	30.2	115,211	30.2	115,211	30.2	115,211	30.2	115,211	30.2	115,211
TCU, Water Transportation	44	1	60	226	30.2	30.2	23,653	30.2	23,653	30.2	23,653	30.2	23,653	30.2	23,653
TCU, Transportation by Air	45	50	175	134	30.2	30.2	14,053	30.2	14,053	30.2	14,053	30.2	14,053	30.2	14,053
TCU, Transportation Services	47	141	544	456	30.2	30.2	47,796	30.2	47,796	30.2	47,796	30.2	47,796	30.2	47,796
TCU, Communication	48	1,750	2,612	559	30.2	30.2	58,553	30.2	58,553	30.2	58,553	30.2	58,553	30.2	58,553
TCU, Electric, Gas, Sanitary Services	49	792	1,570	601	30.2	30.2	62,954	30.2	62,954	30.2	62,954	30.2	62,954	30.2	62,954
Wholesale Trade, Durable Goods	50	7,958	11,368	2,150	16.8	16.8	125,332	16.8	125,332	16.8	125,332	16.8	125,332	16.8	125,332
Wholesale Trade, Nondurable Goods	51	3,750	6,279	1,761	16.8	16.8	102,675	16.8	102,675	16.8	102,675	16.8	102,675	16.8	102,675
Retail Trade, Bldg. Materials, Garden	52	1,162	1,750	383	16.8	16.8	22,345	16.8	22,345	16.8	22,345	16.8	22,345	16.8	22,345
Retail Trade, General Merchandise Stores	53	8,213	7,732	(231)	16.8	16.8	(13,465)	16.8	(13,465)	16.8	(13,465)	16.8	(13,465)	16.8	(13,465)
Retail Trade, Food Stores	54	6,679	8,247	900	16.8	16.8	52,495	16.8	52,495	16.8	52,495	16.8	52,495	16.8	52,495
Retail Trade, Auto Dealers, Service Stations	55	6,643	8,953	1,403	16.8	16.8	81,815	16.8	81,815	16.8	81,815	16.8	81,815	16.8	81,815
Retail Trade, Apparel, Accessories	56	3,135	4,301	716	16.8	16.8	41,769	16.8	41,769	16.8	41,769	16.8	41,769	16.8	41,769
Retail Trade, Furniture, Furnishings	57	1,866	2,706	535	16.8	16.8	31,169	16.8	31,169	16.8	31,169	16.8	31,169	16.8	31,169
Retail Trade, Eating, Drinking Places	58	13,243	16,804	2,081	16.8	16.8	121,337	16.8	121,337	16.8	121,337	16.8	121,337	16.8	121,337
Retail Trade, Miscellaneous	59	8,017	8,113	48	16.8	16.8	2,820	16.8	2,820	16.8	2,820	16.8	2,820	16.8	2,820

F.I.R.E., Banking	60	2,373	2,110	(122)	59.0	(24,878)	23.0	(9,712)
F.I.R.E., Credit Agencies (not banks)	61	1,255	1,814	355	59.0	72,694	54.6	67,240
F.I.R.E., Security, Commodity Brokers	62	1	78	323	59.0	66,158	14.7	16,430
F.I.R.E., Insurance Carriers	63	825	1,069	145	59.0	29,594	80.3	40,291
F.I.R.E., Insurance Agents, Brokers	64	130	685	741	59.0	151,788	36.8	94,622
F.I.R.E., Real Estate	65/66	3,278	4,572	804	59.0	163,563	27.0	75,209
F.I.R.E., Holding, Other Investments	67	68	398	465	59.0	95,268	31.4	50,658
Services, Hotels, Other Lodgings	70	1,064	2,118	816	19.0	53,793	13.6	38,532
Services, Personal	72	3,734	4,342	336	19.0	22,140	4.7	5,433
Services, Business	73	14,438	24,107	6,722	19.0	443,186	37.1	865,245
Services, Auto Repair, Garages	75	2,003	2,774	477	19.0	31,424	.3	492
Services, Miscellaneous Repair	76	1,175	1,356	99	19.0	6,558	17.9	6,191
Services, Motion Pictures	78	375	447	40	19.0	2,665	4.7	656
Services, Amusement, Recreation	79	2,479	2,402	(38)	19.0	(2,485)	27.4	(3,586)
Services, Health	80	7,824	12,554	3,208	19.0	211,509	7.6	84,875
Services, Legal	81	757	1,063	191	19.0	12,582	37.9	25,098
Services, Educational	82	1,661	2,710	719	19.0	47,397	.7	1,681
Services, Social	83	1,479	2,592	797	19.0	52,563	20.7	57,262
Services, Membership Organizations	86	2,326	3,571	821	19.0	54,157	32.1	91,444
Services, Miscellaneous	89	1,313	4,571	3,485	19.0	229,751	30.5	368,241
Total estimated sq. ft. = 3,007,473								
SIC 40-89 = 2,608,192								
SIC 1-39 = 399,281								

Sources: <sup>a</sup>U.S. Department of Commerce, County Business Patterns, 1980 and 1986; <sup>b</sup>Assuming the 1980 to 1986 growth rate continues from 1986 to 1989; <sup>c</sup>Estimates of the share of office space derived by J. R. Kimball and B. S. Bloomberg, Office Space Demand Analysis, *Appraisal Journal*, October 1987, 567-77; <sup>d</sup>= column 4 \* column 5 \* 347 sq. ft.; <sup>e</sup>derivation described in text; <sup>f</sup>= column 4 \* column 7 \* 347 sq. ft.

estate activities. Yet our estimates for most activities are lower than those of other researchers (Kelly, 1983; Kimball and Bloomberg, 1987). The dispersal of some of these sectors, such as SIC 60, banking, and SIC 62, security brokers, suggests that casual empiricism underestimates the share of finance-related employment in suburbs that is in small mixed-use commercial centers and home based.

## Projecting Office Demand

The percentages of office-based employees were then used to project net new office space demand between 1986 and 1989. We assumed the 1980 to 1986 employment growth rate prevailed between 1986 and 1989, and 347 square feet per office-based employee (Gruen and Gruen, 1986).<sup>6</sup> The 347 square feet per office-based employee was used to capture gross space per employee including, lobby, stairwells, elevator space, etc., which is included in the office survey. Smaller estimates of space per employee could be used without changing the methodology adopted here.

In retrospect, a continuation of the 1980–86 growth rate was optimistic. However, standing in 1986, this was a reasonable assumption. In other words, if in 1986, we had to predict 1989 office space demand, what would have been our best estimate?

The source for the 1980 and 1986 employment data is the Census Bureau's *County Business Patterns*.<sup>7</sup> Although services industries, SICs through 89, are the major users of office space, agriculture, mining, manufacturing, and government are also relevant sources of office demand. In the Washington, D.C. metropolitan region, the federal government is a particularly important office space user. To deal with these additional sources of demand, we (1) adopted the K&B estimates of the share of office-based employment in agriculture, mining and manufacturing, and (2) obtained the actual federal government office space consumption for Prince George's from the U.S. Government Services Administration.

The projection results are reported in Exhibit 6, where our estimates are compared with those that would be obtained with K&B's estimates of office space use per industry. Exhibit 7 compares the final projections of our upper and lower bound and K&B's estimates along with actual leased county office space in 1989. Our upper bound estimates are the most accurate, but both the upper and lower bound estimates and the K&B estimates of office use per industry provide relatively similar results.

The largest error in projecting actual office demand arises from the unforeseen slowdown in county employment growth. Assuming a continuation of the 1980 to 1986 growth rate throughout the 1986 to 1989 period substantially overestimates 1986 to 1989 employment growth. (Compare projected net employment change in Appendix 1 with actual net change in Appendix 2.) Using actual 1989 employment, both our estimates and those of K&B underestimate office demand by 17% to 19% (see Exhibit 8).

The gap between projected demand and actual leased space may be explained, in part, by the difference between leased and occupied space. The Prince George's County office space survey measured total space, leased plus vacant space. Using employment to estimate demand represents occupied space only. Space may be leased before the building is available for occupancy. Or an establishment may temporarily

**Exhibit 7**  
**Comparison of Office Demand Estimates, Upper and Lower Bound Estimates and Comparison with Kimball and Bloomberg Methodology**

	Lower bound	Upper bound	Kimball Bloomberg
1986 demand for office space, sq. ft. (supply—vacancy) <sup>a</sup>	12,069,818	12,069,818	12,069,818
Projected increase in private office demand 1986 to 1989, sq. ft. <sup>b</sup>	2,636,389	3,258,021	3,007,473
Federal Gov't demand 1989, sq. ft. <sup>c</sup>	1,230,859	1,230,859	1,230,859
Total projected demand 1989, sq. ft. <sup>d</sup>	15,937,066	16,558,698	16,308,150
Actual 1989 demand sq. ft. (supply—vacancy) <sup>e</sup>	18,144,833	18,144,833	18,144,833
Absolute error	(2,207,767)	(1,566,135)	(1,836,683)
Percentage error <sup>f</sup>	12	9	10

*Sources:* <sup>a</sup>actual demand 1986 is total leased space (total space—vacant space); Prince George's County Economic Development Corporation (1990)

<sup>b</sup>estimates from Table 2 and Appendix 2

<sup>c</sup>Federal Government demand: U.S. Government Service Administration, Suburban Maryland Real Estate Division, April 1992

<sup>d</sup>row 1 + row 2 + row 3

<sup>e</sup>actual demand 1989, is total leased space (total space—vacant space); Prince George's County Economic Development Corporation (1990); Survey of Office Space in Prince George's County, Maryland (May)

<sup>f</sup>row 5—row 4

<sup>g</sup>row 6/row 5

**Exhibit 8**  
**Comparison of Office Demand Estimates, Upper and Lower Bound Estimates and Comparison with Kimbell and Bloomberg using Actual 1989 Employment Change**

	Lower bound	Upper bound	Kimball Bloomberg
Actual 1986 office demand, sq. ft. (supply—vacancy) <sup>a</sup>	12,069,818	12,069,818	12,069,818
Projected increase in private office space demand, 1986 to 1989, sq. ft. <sup>b</sup>	1,388,195	1,748,200	1,580,348
Federal Gov't demand 1989, sq. ft. <sup>c</sup>	1,230,859	1,230,859	1,230,859
Total 1989 projected demand, sq. ft. <sup>d</sup>	14,688,872	15,048,877	14,881,025
Actual 1989 demand, sq. ft. (supply—vacancy) <sup>e</sup>	18,144,833	18,144,833	18,144,833
Absolute error, sq. ft. <sup>f</sup>	(3,455,961)	(3,095,956)	(3,263,808)
Percentage error <sup>g</sup>	19	17	18

*Source:* <sup>a</sup>actual demand 1986 is total leased space (total space—vacant space); Prince George's County Economic Development Corporation (1990);

<sup>b</sup>estimated from the method described in text, from Table 2 and Appendix 2

<sup>c</sup>Federal Government demand: U.S. Government Service Administration, Suburban Maryland Real Estate Division, April 1992

<sup>d</sup>row 1 + row 2 + row 3

<sup>e</sup>actual demand 1989 is total leased space (total space—vacant space); Prince George's County Economic Development Corporation (1990); Survey of Office Space in Prince George's County, Maryland (May)

<sup>f</sup>row 5—row 4

<sup>g</sup>row 6/row 5

lease space in two buildings, because it is in the process of moving; may have leased space but has not yet moved in; vacated space because it has gone out of business, or leased space in good years but was unable to fill the space in the lean, late 1980s.

A second factor responsible for some small portion of the gap is county government demand. County officials estimate the county leases only 250,000 to 300,000 square feet of private office space, not enough to substantially reduce the error rate.<sup>8</sup>

## Conclusion

By matching the county employees in establishments with an office space data set, we were able to estimate the share of employees located in office buildings at the two-digit level of industrial detail. At the two-digit level of industrial detail, our results are vastly different from those of earlier studies. For example, the share of some finance employees in offices is lower than expected and assumed by other studies (Kelly, 1983; Kimball and Bloomberg, 1987). But surprisingly, when aggregated across all two-digit industries both our method and that of Kimball and Bloomberg (1987) yield similar office space demand projections.

The estimates presented here should enhance the accuracy of future office demand projections. The availability of office-based employment shares at the two-digit level will improve predictions for smaller, less diverse suburban economies or suburban economies with an industry mix substantially different from that of Prince George's County, Maryland. Further research efforts should repeat this analysis for other jurisdictions to determine the generalizability of our estimates and to begin to measure the impact of industry structure, land values, planning decisions, and transportation access upon the shares of employees in offices.

## Notes

<sup>1</sup>Estimates of the share of employees in free-standing offices were therefore possible for all two-digit SIC code industries between 40 and 89, except SICs 43, postal services, and 46, pipelines, except natural gas. Note: not every number between 40 and 89 has an accompanying industrial category.

<sup>2</sup>Defined as SIC codes 40 through 89.

<sup>3</sup>These same data are also available annually and directly from Dun and Bradstreet. The Small Business Administration made several adjustments to the original Dun and Bradstreet data, most of which do not affect the analysis here. For a further discussion of the Small Business Administration and University of Maryland adjustments to the Dun and Bradstreet data, please contact the author.

<sup>4</sup>Data on coverage of the USEEM data for Prince George's County are available from the authors on request.

<sup>5</sup>The potential for systematic errors by SIC code or zip codes was investigated by comparing the percentage of matches across industry and location. The share of matches is relatively even across industries and higher in the older, more developed regions of the county. These data are available upon request.

$${}^6 \sum_{i=40}^{89} NG_i * a_i * SF, \quad (3)$$

where

subscript  $i$  = set of two-digit SIC-codes summed,

*NG*=net employment growth at two-digit SIC-code,  
*a*=percent of office-based employees,  
*SF*=gross square feet of office space/number of employees.

<sup>7</sup>We could have used the United States Establishment and Enterprise Microdata file for these values, but to facilitate applicability to other jurisdictions and provide consistency with the 1989 test for accuracy, we chose to use data from the *County Business Patterns*.

<sup>8</sup>Prince George's County Government, Division of Real Estate—Acquisition, Marketing, Appraisal, and Leasing.

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### Appendix 1 Projected Office Space Demand using Upper Bound Estimates of the Share of Industry Employment in Office Buildings

Industry description	Two-digit SIC code	1980 Employment (C.B.P. 1980)	1986 Employment (C.B.P. 1986)	Projected net change for 1989 employment	Percent of office-based employees (A:K&B)	Projected net new '89 space demand (A:K&B)	Percent of office-based employees (MH&DW)	Projected net new '89 space demand (MH&DW)
Agriculture, Agricultural Services	7	725	1,185	316	2.6	2,847	2.6	2,847
Mining, Nonmetallic Minerals	14	217	383	119	18.8	7,791	18.8	7,791
Construction, Gen. Building Contractors	15	3,101	4,177	653	14.6	33,107	14.6	33,107
Construction, Spec. Trade Contractors	17	13,306	21,077	5,228	14.6	264,885	14.6	264,885
Manufacturing, Apparel, Other Textiles	23	92	102	5	17.0	316	17.0	316
Manufacturing, Paper, Allied Products	25	384	619	160	17.0	9,429	17.0	9,429
Manufacturing, Printing, Publishing	27	2,949	3,831	523	17.0	30,874	17.0	30,874
Manufacturing, Stone, Clay, Glass	32	951	866	(40)	17.0	(2,354)	17.0	(2,354)
Manufacturing, Fabricated Metal Products	34	1,147	1,289	77	17.0	4,524	17.0	4,524
Manufacturing, Machinery except Electric	35	613	436	(70)	17.0	(4,138)	17.0	(4,138)
Manufacturing, Electric, Electronics	36	1,873	2,916	694	17.0	40,951	17.0	40,951
Manufacturing, Instruments & Related Pro	38	126	284	132	17.0	7,771	17.0	7,771
Manufacturing, Miscellaneous	39	128	209	56	17.0	3,276	17.0	3,276
TCU, Local Passenger Rail	41	375	317	(26)	30.2	(2,713)	6.33	(569)
TCU, Trucking, Warehousing	42	5,358	7,175	1,099	30.2	115,211	1.18	4,502
TCU, Water Transportation	44	1	60	226	30.2	23,653	.0	0
TCU, Transportation by Air	45	50	175	134	30.2	14,053	60.61	28,203
TCU, Transportation Services	47	141	544	456	30.2	47,796	65.33	103,394
TCU, Communication	48	1,750	2,612	559	30.2	58,553	59.81	115,962
TCU, Electric, Gas, Sanitary Services	49	792	1,570	601	30.2	62,954	.0	0
Wholesale Trade, Durable Goods	50	7,958	11,368	2,150	16.8	125,332	14.59	108,845
Wholesale Trade, Nondurable Goods	51	3,750	6,279	1,761	16.8	102,675	7.69	46,998
Retail Trade, Bldg. Materials & Garden	52	1,162	1,750	383	16.8	22,345	3.18	4,230
Retail Trade, General Merchandise Stores	53	8,213	7,732	(231)	16.8	(13,465)	8.45	(6,773)
Retail Trade, Food Stores	54	6,679	8,247	900	16.8	52,495	.07	219
Retail Trade, Auto Dealers & Serv. Stations	55	6,643	8,953	1,403	16.8	81,815	.21	1,023
Retail Trade, Apparel, Accessories	56	3,135	4,301	716	16.8	41,769	2.64	6,564
Retail Trade, Furniture, Furnishings	57	1,866	2,706	535	16.8	31,169	1.59	2,950
Retail Trade, Eating, Drinking Places	58	13,243	16,804	2,081	16.8	121,337	3.62	26,145
Retail Trade, Miscellaneous	59	8,017	8,113	48	16.8	2,820	2.97	499



F.I.R.E., Banking	60	2,373	2,110	(122)	59.0	(24,878)	29.80	(12,566)
F.I.R.E., Credit Agencies (not banks)	61	1,255	1,814	355	59.0	72,694	65.25	80,395
F.I.R.E., Security, Commodity Brokers	62	1	78	323	59.0	66,158	23.67	26,542
F.I.R.E., Insurance Carriers	63	825	1,069	145	59.0	29,594	83.37	41,818
F.I.R.E., Insurance Agents, Brokers	64	130	685	741	59.0	151,788	42.05	108,181
F.I.R.E., Real Estate	65/66	3,278	4,572	804	59.0	164,528	32.06	89,443
F.I.R.E., Holding, Other Investments	67	68	398	465	59.0	95,268	45.71	73,809
Services, Hotels, Other Lodgings	70	1,064	2,118	816	19.0	53,793	18.44	52,207
Services, Personal	72	3,734	4,342	336	19.0	22,140	5.56	6,479
Services, Business	73	14,438	24,107	6,722	19.0	443,186	52.55	1,225,759
Services, Auto Repair, Garages	75	2,003	2,774	477	19.0	31,424	36	595
Services, Miscellaneous Repair	76	1,175	1,356	99	19.0	6,558	20.77	7,169
Services, Motion Pictures	78	375	447	40	19.0	2,665	5.95	834
Services, Amusement, Recreation	79	2,479	2,402	(38)	19.0	(2,485)	42.70	(5,586)
Services, Health	80	7,824	12,554	3208	19.0	211,509	8.14	90,615
Services, Legal	81	757	1,063	191	19.0	12,582	47.97	31,766
Services, Educational	82	1,661	2,710	719	19.0	47,397	.75	1,871
Services, Social	83	1,479	2,592	797	19.0	52,563	24.77	68,525
Services, Membership Organizations	86	2,326	3,571	821	19.0	54,157	40.16	114,470
Services, Miscellaneous	89	1,313	4,571	3,485	19.0	229,751	34.12	412,585
Total estimated sq. ft. = 3,007,473								
SIC 41-89 = 2,608,192								
SIC 1-39 = 399,281								

Sources: Employment Data—U.S. Department of Commerce, County Business Patterns, 1980 and 1986; A:K&B Percentages—J. R. Kimball and B. S. Bloomberg, Office Space Demand Analysis, *Appraisal Journal*, October 1987, 567-77

**Appendix 2**  
**Office Demand Projections Using Actual Rather Than Projected 1989 Employment Totals, Using Upper Bound Estimates of the Share of Employment in Offices**

Industry description	Two-digit SIC code	Projected net change in employment 1986-1989	Actual net change in employment 1986-1989	Percent of office-based employees (A:K&B)	Projected new 1989 space demand (A:K&B)	Percent of office-based employees (MH&DW)	Projected new 1989 space demand (MH&DW)
Agriculture, Agricultural Services	7	316	(788)	2.6	(7,109)	2.6	(7,109)
Mining, Nonmetallic Minerals	14	119	(59)	18.8	(3,849)	18.8	(3,849)
Construction, Gen. Building Contractors	15	653	61	14.6	3,090	14.6	3,090
Construction, Spec. Trade Contractors	17	5,228	220	14.6	11,146	14.6	11,146
Manufacturing, Apparel, Other Textiles	23	5	7	17.0	413	17.0	413
Manufacturing, Paper, Allied Products	25	160	(134)	17.0	(7,905)	17.0	(7,905)
Manufacturing, Printing, Publishing	27	523	816	17.0	48,136	17.0	48,136
Manufacturing, Stone, Clay, Glass	32	(40)	47	17.0	2,773	17.0	2,773
Manufacturing, Fabricated Metal Products	34	77	525	17.0	30,970	17.0	30,970
Manufacturing, Machinery except Electric	35	(70)	228	17.0	13,450	17.0	13,450
Manufacturing, Electric, Electronics	36	694	(2,514)	17.0	(148,301)	17.0	(148,301)
Manufacturing, Instruments & Related Pro	38	132	1,368	17.0	80,698	17.0	80,698
Manufacturing, Miscellaneous	39	56	172	17.0	10,146	17.0	10,146
TCU, Local Passenger Rail	41	(26)	63	30.2	6,602	6.13	1,341
TCU, Trucking, Warehousing	42	1,099	3,035	30.2	318,050	.92	9,691
TCU, Water Transportation	44	226	115	30.2	12,051	.0	0
TCU, Transportation by Air	45	134	200	30.2	20,959	19.61	13,608
TCU, Transportation Services	47	456	(101)	30.2	(10,584)	63.33	(22,196)
TCU, Communication	48	559	1,690	30.2	177,102	52.07	305,372
TCU, Electric, Gas, Sanitary Services	49	601	(140)	30.2	(14,671)	.0	0
Wholesale Trade, Durable Goods	50	2,150	295	16.8	17,197	10.74	10,994
Wholesale Trade, Nondurable Goods	51	1,761	(197)	16.8	(11,484)	6.35	(4,344)
Retail Trade, Bldg. Materials & Garden	52	383	19	16.8	1,108	2.47	163
Retail Trade, General Merchandise Stores	53	(231)	(497)	16.8	(28,973)	5.25	(9,061)
Retail Trade, Food Stores	54	900	(326)	16.8	(19,004)	.05	(60)
Retail Trade, Auto Dealers & Serv. Stations	55	1,403	(262)	16.8	(15,274)	.15	(140)
Retail Trade, Apparel, Accessories	56	716	78	16.8	4,547	2.03	551
Retail Trade, Furniture, Furnishings	57	535	248	16.8	14,457	1.33	1,149
Retail Trade, Eating, Drinking Places	58	2,081	1,660	16.8	96,771	2.63	15,148
Retail Trade, Miscellaneous	59	48	668	16.8	38,942	2.42	5,618

F.I.R.E., Banking	60	(122)	1,789	59.0	366,262	23.03	142,980	
F.I.R.E., Credit Agencies (not banks)	61	355	(725)	59.0	(148,429)	54.57	(137,292)	
F.I.R.E., Security, Commodity Brokers	62	323	56	59.0	11,465	14.65	2,847	
F.I.R.E., Insurance Carriers	63	145	203	59.0	41,560	80.32	56,581	
F.I.R.E., Insurance Agents, Brokers	64	741	152	59.0	31,119	36.78	19,399	
F.I.R.E., Real Estate	65/66	804	(1,492)	59.0	(305,457)	26.97	(139,645)	
F.I.R.E., Holding, Other Investments	67	465	336	59.0	68,789	31.37	36,578	
Services, Hotels, Other Lodgings	70	816	582	19.0	38,371	13.61	27,486	
Services, Personal	72	336	63	19.0	4,154	4.66	1,019	
Services, Business	73	6,722	1,869	19.0	123,223	37.09	240,572	
Services, Auto Repair, Garages	75	477	315	19.0	20,768	.30	325	
Services, Miscellaneous Repair	76	99	151	19.0	9,955	17.94	9,398	
Services, Motion Pictures	78	40	303	19.0	19,977	4.68	4,921	
Services, Amusement, Recreation	79	(38)	1,402	19.0	92,434	27.41	133,372	
Services, Health	80	3,208	3,473	19.0	228,975	7.62	91,884	
Services, Legal	81	191	178	19.0	11,736	37.90	23,410	
Services, Educational	82	719	9	19.0	593	.67	21	
Services, Social	83	797	315	19.0	20,768	20.70	22,625	
Services, Membership Organizations	86	821	1,035	19.0	68,238	32.08	115,220	
Services, Miscellaneous	89	3,485	3,667	19.0	241,765	30.45	387,497	
Total estimated sq. ft. = 1,587,719								1,400,687
SIC 41-89 = 1,554,061								1,367,029
SIC 1-39 =								33,658

Sources: Employment Data—U.S. Department of Commerce, County Business Patterns, 1980 and 1986; A:K&B Percentages—J. R. Kimball and B. S. Bloomberg, Office Space Demand Analysis, *Appraisal Journal*, October 1987, 567-77

**Appendix 3**  
**Office Demand Projections Using Actual Rather Than Projected 1989 Employment Totals, and Upper**  
**Bound Estimates of the Share of Employment in Office Buildings**

Industry description	Two-digit SIC code	Projected net change in employment 1986-1989	Actual net change in employment 1986-1989	Percent of office-based employees (K&B)	Projected new 1989 space demand (K&B)	Percent of office-based employees (MH&DW)	Projected new 1989 space demand (MH&DW)
Agriculture, Agricultural Services	7	316	(788)	2.6	(7,109)	2.6	(7,109)
Mining, Nonmetallic Minerals	14	119	(59)	18.8	(3,849)	18.8	(3,849)
Construction, Gen. Building Contractors	15	653	61	14.6	3,090	14.6	3,090
Construction, Spec. Trade Contractors	17	5,228	220	14.6	11,146	14.6	11,146
Manufacturing, Apparel, Other Textiles	23	5	7	17.0	413	17.0	413
Manufacturing, Paper, Allied Products	25	160	(134)	17.0	(7,905)	17.0	(7,905)
Manufacturing, Printing, Publishing	27	523	816	17.0	48,136	17.0	48,136
Manufacturing, Stone, Clay, Glass	32	(40)	47	17.0	2,773	17.0	2,773
Manufacturing, Fabricated Metal Products	34	77	525	17.0	30,970	17.0	30,970
Manufacturing, Machinery except Electric	35	(70)	228	17.0	13,450	17.0	13,450
Manufacturing, Electric, Electronics	36	694	(2,514)	17.0	(148,301)	17.0	(148,301)
Manufacturing, Instruments & Related Pro	38	132	1,368	17.0	80,698	17.0	80,698
Manufacturing, Miscellaneous	39	56	172	17.0	10,146	17.0	10,146
Transport., Communic., Utilities (TCU)	40	0	0	30.2	0	100.00	0
TCU, Local Passenger Rail	41	(26)	63	30.2	6,602	6.33	1,384
TCU, Trucking, Warehousing	42	1,099	3,035	30.2	318,050	1.18	12,427
TCU, Water Transportation	44	226	115	30.2	12,051	.0	0
TCU, Transportation by Air	45	134	200	30.2	20,959	60.61	42,063
TCU, Transportation Services	47	456	(101)	30.2	(10,584)	65.33	(22,896)
TCU, Communication	48	559	1,690	30.2	177,102	59.81	350,744
TCU, Electric, Gas, Sanitary Services	49	601	(140)	30.2	(14,671)	.0	0
Wholesale Trade, Durable Goods	50	2,150	295	16.8	17,197	14.59	14,935
Wholesale Trade, Nondurable Goods	51	1,761	(197)	16.8	(11,484)	7.69	(5,257)
Retail Trade, Bldg. Materials & Garden	52	383	19	16.8	1,108	3.18	210
Retail Trade, General Merchandise Stores	53	(231)	(497)	16.8	(28,973)	8.45	(14,573)
Retail Trade, Food Stores	54	900	(326)	16.8	(19,004)	.07	(79)
Retail Trade, Auto Dealers & Serv. Stations	55	1,403	(262)	16.8	(15,274)	.21	(191)
Retail Trade, Apparel, Accessories	56	716	78	16.8	4,547	2.64	715
Retail Trade, Furniture, Furnishings	57	535	248	16.8	14,457	1.59	1,368
Retail Trade, Eating, Drinking Places	58	2,081	1,660	16.8	96,771	3.62	20,852
Retail Trade, Miscellaneous	59	48	668	16.8	38,942	2.97	6,884

F.I.R.E., Banking	60	(122)	1,789	59.0	366,262	29.80	184,993	
F.I.R.E., Credit Agencies (not banks)	61	355	(725)	59.0	(148,429)	65.25	(164,153)	
F.I.R.E., Security, Commodity Brokers	62	323	56	59.0	11,465	23.67	4,600	
F.I.R.E., Insurance Carriers	63	145	203	59.0	41,560	83.37	58,727	
F.I.R.E., Insurance Agents, Brokers	64	741	152	59.0	31,119	42.05	22,179	
F.I.R.E., Real Estate	65/66	804	(1,492)	59.0	(305,457)	32.06	(165,982)	
F.I.R.E., Holding, Other Investments	67	465	336	59.0	68,789	45.71	53,294	
Services, Hotels, Other Lodgings	70	816	582	19.0	38,371	18.44	37,240	
Services, Personal	72	336	63	19.0	4,154	5.56	1,215	
Services, Business	73	6,722	1,869	19.0	123,223	52.55	340,809	
Services, Auto Repair, Garages	75	477	315	19.0	20,768	36	393	
Services, Miscellaneous Repair	76	99	151	19.0	9,955	20.77	10,883	
Services, Motion Pictures	78	40	303	19.0	19,977	5.95	6,256	
Services, Amusement, Recreation	79	(38)	1,402	19.0	92,434	42.70	207,733	
Services, Health	80	3,208	3,473	19.0	228,975	8.14	98,098	
Services, Legal	81	191	178	19.0	11,736	47.97	29,629	
Services, Educational	82	719	9	19.0	593	.75	23	
Services, Social	83	797	315	19.0	20,768	24.77	27,075	
Services, Museums, Gardens	84	0	0	19.0	0	.0	0	
Services, Membership Organizations	86	821	1,035	19.0	68,238	40.16	144,233	
Services, Miscellaneous	89	3,485	3,667	19.0	241,765	32.12	408,711	
Total estimated sq. ft = 1,587,719								1,748,200
SIC 41-89 = 1,554,061								1,714,542
SIC 1-39 = 33,658								33,658

Sources: Employment Data—U.S. Department of Commerce, County Business Patterns, 1980 and 1986; K&B Percentages—J. R. Kimball and B. S. Bloomberg, Office Space Demand Analysis, *Appraisal Journal*, October 1987, 567-77