AUSTRALIAN REAL HOUSING COSTS

Steven C. Bourassa
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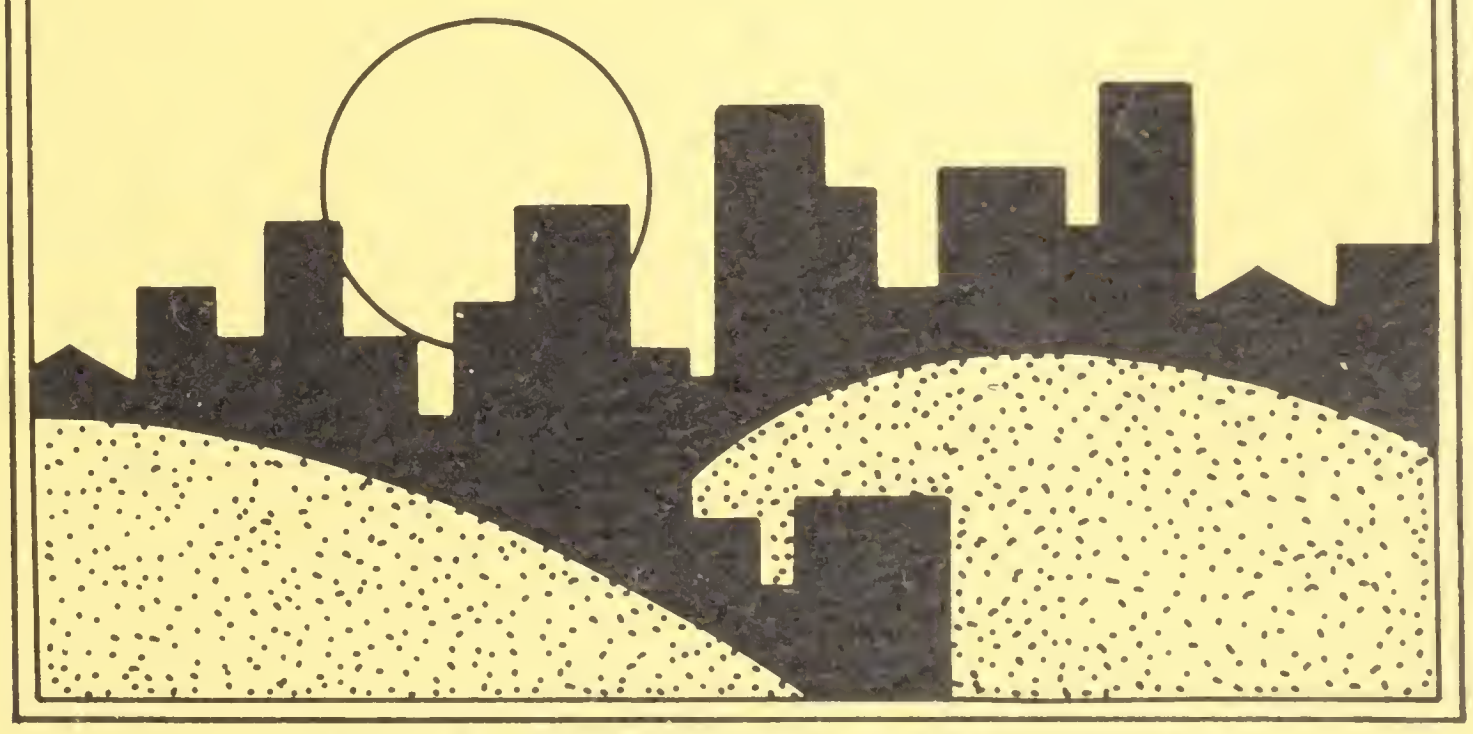
Urban Research Program
Working Paper No.36
June 1993



URBAN RESEARCH PROGRAM

RESEARCH SCHOOL OF SOCIAL SCIENCES

AUSTRALIAN NATIONAL UNIVERSITY

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ABSTRACT

Housing costs are important determinants of many individual and household decisions. This paper reviews the housing cost data available in Australia, and derives and presents series of real price indexes for 1979-92 and real rent indexes for 1980-92 for most of the capital cities. It also shows how the costs of owning and renting can be compared. Increases in real prices and, more importantly, real interest rates have occurred while real rents have remained stable. Consequently, the annual cost of owning relative to renting has increased dramatically, particularly for younger Australians who have not yet purchased a house.

AUSTRALIAN REAL HOUSING COSTS, 1979-92

STEVEN C. BOURASSA AND PATRIC H. HENDERSHOTT

Real housing costs are important determinants of many individual and household decisions. When individuals leave their parental home and how they then group up depends on the real cost of housing. The higher the cost, the later the departure and more likely individuals are to live in large groups. Also, the higher the cost of owner-occupied housing relative to the cost of rental housing, the less likely are households to be owners rather than renters. Finally, the higher are the costs of owning and renting, respectively, the lower will be the quantity of owner or rental housing demanded.[1] Measuring real housing costs accurately is crucial to identifying the impacts of housing costs on these decisions. Accurate measurement is also a prerequisite to studying the determinants of real housing costs.

There are three key principles to measuring housing costs. First, the costs must be in real terms. Because of inflation, almost all costs have risen in the last decade. An important issue is whether housing costs have risen in real terms, *i.e.*, relative to other prices. Second, the costs must refer to a "constant-quality" housing unit. The quality of the housing stock generally rises over time as larger houses with better amenities are constructed, as major renovations are undertaken, and as lower quality houses are discarded. Thus, the real median price of a unit in a locality can increase without costs rising; real median prices will be higher, or will increase

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1 For evidence that these decisions of Australians are affected by housing costs, see Bourassa *et al.* (forthcoming). Bourassa (forthcoming) shows how the relative costs of owning and renting affect housing tenure choice in Australia.

more rapidly in some areas than others, not because real housing costs are higher or have risen faster but because the quality of housing is better or has increased more. Third, the cost must refer to the per period (typically annual) cost of renting or using a constant-quality unit. This is a natural measure for rental housing, but not for owner housing. Nonetheless, the appropriate measure for owner housing is the annual cost of renting or using (thus the term "user cost") a constant-quality house.

Our discussion of real housing costs is divided into three parts: the real cost of rental housing, the real asset price of owner-occupied houses, and the real annual user cost for owner-occupied housing. For each of the first two measures, we present annual data for seven Australian capital cities (all but Darwin). For the last, we present an annual time series for Australia and compare it with a series constructed using the Australian Bureau of Statistics' (ABS's) current computation method. Figures of the various data series and tables listing the data are presented.

Examination of the series reveals the following changes. From 1980 to 1992, average real rents increased by 8 percent, with the range being a 14 percent increase for Sydney to a 16 percent real decrease in Hobart. From 1979 to 1992, real house asset prices have increased by 40 percent on average. Perth and Adelaide had increases of only 6 and 16 percent, respectively, while the other cities had increases in the 32 to 69 percent range. The greatest change was in the user cost for owner-occupied housing. An enormous increase in real interest rates quadrupled the annual user cost.

I. The Real Cost of Rental Housing

The ABS has published Consumer Price Index (CPI) constant-quality private rent indexes for the capital cities except Canberra and Darwin since 1960.[2] Canberra was added in 1964 and Darwin in 1982. These indexes should accurately portray the movement in nominal costs for individual cities over time. To convert these into real indexes, we deflate (divide) them by a measure of the non-housing cost of living. Because this cost does not appear to vary across capital cities (the net-of-shelter CPIs for the capital cities move almost identically), we simply use the national net-of-shelter CPI as the deflator. The resulting series, scaled to one in 1980, are plotted in Figure 1 (the data are reported in Table 1).

As can be seen, these series exhibit both an upward trend and some volatility. Real rents rose by about 10 to 15 percent in Sydney, Melbourne, and Canberra (most of the Sydney rise occurring in 1987 and 1988 and the Melbourne rise in 1984) and 6 percent in Adelaide. Canberra costs were the most volatile, rising by 25 percent in 1984 and 1985 and then giving up almost that entire gain in the next five years. The Brisbane series is basically flat, while real rents have fallen by 16 percent in Hobart.

As interesting as these series are, they say little about the relative rent *levels* in the seven cities, having been arbitrarily scaled to 1.0 in 1980 (they are equal to each other in some year by construction). That is, the ABS data do not attempt to measure differences in rents across cities, only changes in differences over time. However, the Real Estate Institute of Australia (REIA) has been reporting rents for three-bedroom houses in the capital

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2 Data from 1980 to the present are currently available from the ABS by special order as part of the *Consumer Price Index: Housing Group* (product code CPI.03), which is updated quarterly.

cities other than Darwin and Hobart since 1982. While these are far from constant quality and are far more volatile over time than are the ABS series, they are the best rent level series available.[3] We begin with the REIA rent estimates for the four quarters, September 1991 through June 1992. To retain the time series properties of the ABS data, we multiply these 1991-92 REIA city estimates by the ratio of the ABS CPI rent index for each year in the same city to the 1991-92 ABS CPI rent index for that city. This converts the 1991-92 REIA city data into time series with the properties of the ABS series.

Figure 2 shows real weekly rents (1992$) for the seven cities over the 1980-92 period (data are in Table 2). Real rents were nearly 30 percent higher in Canberra and Sydney in 1980 than in Melbourne, Adelaide, and Perth and ended up 40 (Canberra) to 45 (Sydney) percent higher. Brisbane started out with real rents 10 to 15 percent above Melbourne, Adelaide, and Perth, but ended up about in line with Melbourne and about 10 percent above Adelaide and Perth. Also apparent are the earlier discussed sharp rise and fall in Canberra's rents and the relatively sharp decline in Hobart real rents, which fell from 30 percent above those in Melbourne, Adelaide, and Perth to an equal level in 1992.

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3 For example, between March 1985 and September 1987, the REIA series in Sydney and Canberra rose by 68 and 5 percent, respectively, while the ABS indexes rose by 33 and 23 percent. In contrast, between September 1987 and June 1992, the REIA series fell by 4 percent in Sydney and rose by 34 percent in Canberra, while the ABS indexes rose by 39 and 24 percent, respectively.

The REIA data have become less volatile and more plausible over time. We have chosen the 1991-92 average for the REIA levels because we believe it gives the most plausible cross-city rent relationships over the full period.

Although Hobart has not been surveyed regularly by the REIA, it was included for two quarters in 1987. This allowed us to incorporate Hobart in our real rent series.

II. Real House Prices

The ABS began publishing CPI constant-quality asset price indexes for the capital cities in 1989 when a component reflecting mortgage interest on existing houses replaced the new house construction component. These indexes, which are available from September 1986, should accurately portray the movement in nominal prices over time since then.[4]

The REIA has been reporting sale prices of three-bedroom houses in the capital cities other than Darwin and Hobart since 1979 (Hobart was added in the middle of 1984). Again, while these are hardly constant quality series, they are better than median prices of all houses sold. These series are used for the 1980-86 period; for the post 1986 period the ABS series are spliced onto the REIA series. The series are converted to real indexes by deflating by the CPI net of shelter.

Figure 3 plots the resulting real constant-quality house prices for the 1979-92 period (data are in Table 3). In 1980, a three-bedroom house sold for 80,000 to 85,000 1992 dollars in Brisbane, Adelaide, and Perth, $98,000 in Melbourne, $114,000 in Canberra, and $178,000 in Sydney. By the end of 1992, real prices had drifted upward in all cities, being in the $95,000 to $100,000 range in Adelaide, Perth, and Hobart, about $125,000 in Melbourne and Brisbane, $158,000 in Canberra, and $225,000 in Sydney.

To see more closely how real prices have moved, we have created real indexes by scaling all series to one in 1979. The indexes for Sydney, Melbourne, and a six-city weighted average (excluding Hobart) based on

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4 *House Price Indexes: Eight Capital Cities* (ABS catalogue no. 6416.0), quarterly.

the relative proportion of housing units in each of the capital cities are shown in Figure 4 (data for all of the cities are given in Table 4). The six-city average is close to that for the two cities because they have weights of 0.34 (Sydney) and 0.30 (Melbourne). These series increased by about 40 percent over the period, but the patterns of increase were markedly different. Between 1980 and 1984, real prices rose by 20 percent in Melbourne but fell by 20 percent in Sydney. A 60 percent increase in real Sydney prices between 1984 and 1988 brought the two series together in 1989. Relatively stable prices in Sydney and a 17 percent real decline in Melbourne in the last three years have caused the series to drift apart again.

Figure 5 plots the series for the other four cities. Between 1979 and 1992, real prices rose by 6 percent in Perth, 16 percent in Adelaide, and 55 and 69 percent, respectively, in Brisbane and Canberra. A 50 percent real increase occurred in Adelaide early in the 1980s (34 percent in 1984 alone) but it was largely reversed in 1985-87.

III. The Annual Rental Cost of Owner-Occupied Housing

Obviously, annual costs of renting a three-bedroom house cannot reasonably be compared to the purchase price of the house. Rather, one needs to compute the annual rents one would have to pay oneself as an owner or landlord for using the house for a year and compare these with the cost of renting. In effect, one needs to multiply the real constant-quality house price (CQHP) by a "return" series to get the cost of renting it for a year. Algebraically, the annual user cost for an owner-occupied house is:

$$\text{user cost} = \text{CQHP}(\text{after-tax financing rate} + \text{depreciation} + \text{maintenance} - \text{inflation}).$$

That is, one has to earn a "rental" rate that, along with expected appreciation rate, is sufficient to pay the after-tax financing rate plus the rates of depreciation and maintenance.

The financing cost is complicated in Australia by taxes and the non-deductibility of interest. The cost of own-equity funding is an after-tax interest rate because the owner would be taxed on interest earned if the equity were not invested in the house, but the cost of debt financing is the full pre-tax interest rate. In effect, the non-deductibility of interest penalizes debt financing relative to equity financing, which explains why the aggregate ratio of mortgage debt to housing stock is 0.15 in Australia versus 0.44 in the United States, where interest is largely deductible.

Algebraically, say that i is the pre-tax interest rate (and debt and own-equity interest rates are the same), v is the proportion of debt used in the financing, and t is the tax rate. Then

$$\text{after-tax financing rate} = vi + (1 - v)(1 - t)i = (1 - t)i + tvi.$$

The last term, tvi, represents the tax penalty for debt finance. We emphasize this general point. Countries that allow mortgage interest deductibility *do not* favour debt financing; countries that do not allow interest deductibility *do* penalize debt financing (see Bourassa and Hendershott, 1992, for a more detailed discussion of this point).

Our user cost measure differs in two important ways from that which the ABS uses in the owner cost component of the CPI. First, the ABS financing rate measure ignores taxes and the cost of own equity financing;

the "after-tax" financing rate is just vi, where v appears to be about 0.5.[5] Second, the ABS does not account for expected appreciation in house value. In periods where real interest rates are relatively constant but inflation is changing, the ABS series will move strongly with inflation rather than moving mildly against it, as the user cost will. On the other hand, when inflation is relatively constant and real interest rates are changing, the ABS series will move with the real rates, but not as sharply as the user cost.

Precisely which empirical series or parameters one uses to compute the user cost depends on how one intends to use the resultant cost series. For example, the loan-to-value ratio is much different for low-wealth first-time purchasers than for 50-year-old previous purchasers who are moving to different quarters. Also, the mortgage interest rate would be higher for new buyers than for existing owners if some of the latter can obtain below-market interest rates. Our calculations purport to represent the cost for a low-wealth purchaser of an additional unit of housing services.

For v, we use 0.5, which is a "present-value equivalent" loan-to-value ratio, assuming an initial value of 0.7, normal amortization, modest partial pre-payments and house price appreciation and a ten-year holding period (see Bourassa *et al.*, forthcoming). Differences in debt and equity rates have varied greatly in Australia owing to the lack of integration of the home mortgage market with capital markets. For the own-equity rate, we use the

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5 The ABS 1986 weights for maintenance and mortgage interest were 0.01455 and 0.05961, respectively. Assume that maintenance is 0.02 of house value. Then the product of the loan-to-value ratio and the base year interest rate, vi°, is (.05961/.01455)(.02) = .08. With $i^\circ = 0.155$ in 1986, v = 0.5 (the average v for the 2,700 married couples age 25-54 in the 1986 Income Distribution Survey, 0.23, is less than half this). That is, we wonder whether the weight given to mortgage interest in the CPI is too high.

180-day Treasury rate plus two percentage points (for the risk associated with the risky housing asset financed half by debt); for the debt rate we use the rate on new mortgage loans. The expected inflation rate is a simple average of the percentage rates of change in the GDP deflator for final consumption during the current and previous year. The relevant tax rate is the marginal rate of the assumed first-time buyer.[6] We set it equal to one-third for all years. Lastly the sum of depreciation and maintenance is set equal to 0.035 of a dollar of house value for all years.

The interest and inflation rate series are plotted in Figure 6 (the data are in Table 5). All series happen to be roughly equal at about 9 percent in 1979. As can be seen, expected inflation drifted downward throughout the 1980s, but the interest rates rose. That is, *real* interest rates rose from about zero to over 9 percent in 1989. This should, of course, have sharply raised the user cost for owner-occupied housing.

A user cost series, scaled to unity in 1979, is plotted in Figure 7, along with the comparable average real rent series. The user cost quintupled between 1979 and 1989, before declining slightly in the last two years. The vast majority of the increase was due to the increase in real interest rates, rather than the increase in real house prices. Given that real rents hardly increased at all, we anticipate that the proportion of younger Australians who are owners or purchasers declined sharply in the decade.

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6 The tax rate relevant to the renting-versus-owning decision would not be the marginal rate. On computation of the tenure choice tax rate in Australia, see Bourassa *et al*. (forthcoming).

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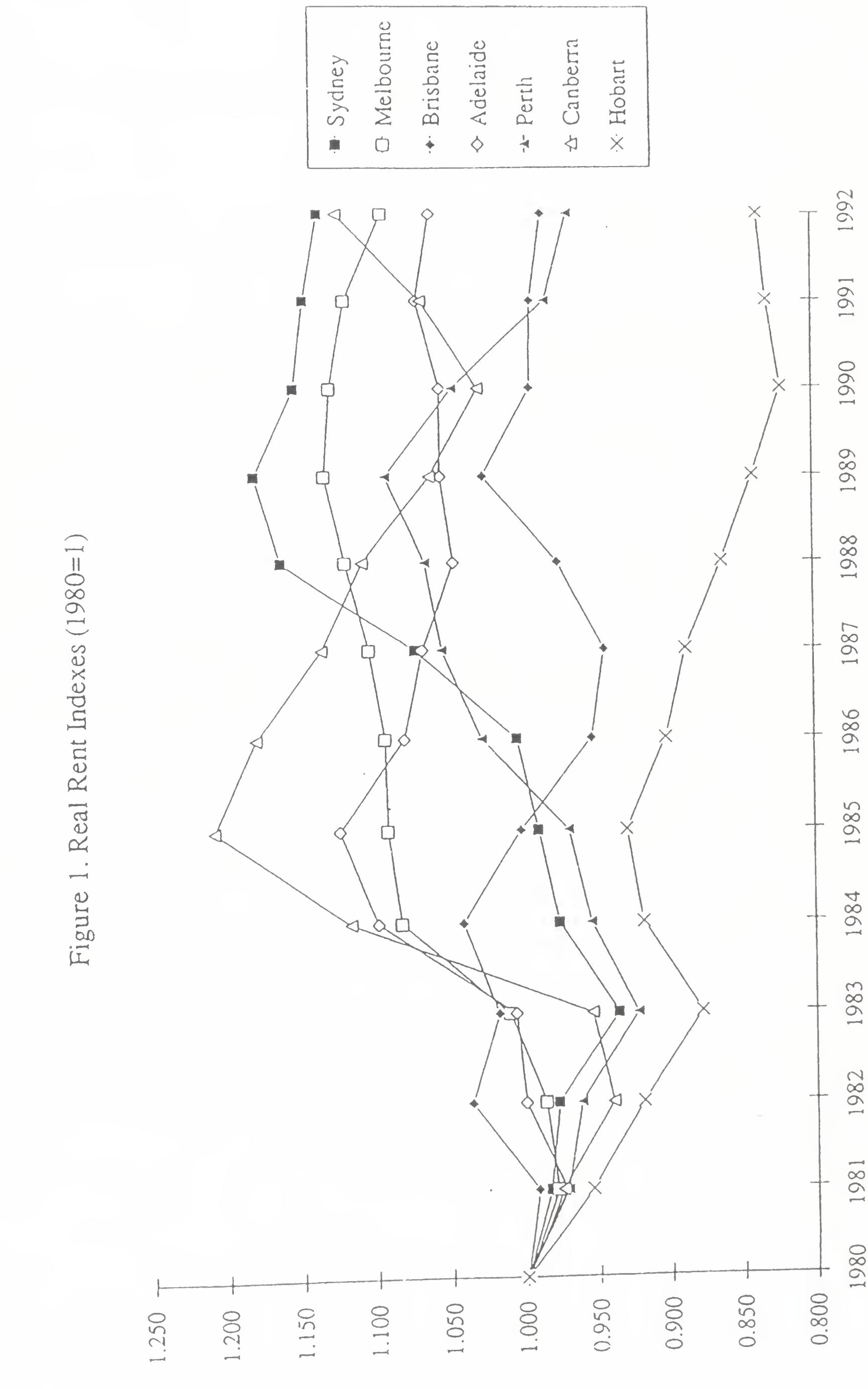


Figure 1. Real Rent Indexes (1980=1)

Table 1. Real Rent Indexes (1980=1)

Year	Sydney	Melbourne	Brisbane	Adelaide	Perth	Canberra	Hobart	Seven cities
1980	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1981	0.984	0.979	0.992	0.973	0.972	0.975	0.955	0.981
1982	0.978	0.987	1.037	1.000	0.963	0.940	0.919	0.986
1983	0.936	1.011	1.018	1.007	0.923	0.955	0.879	0.970
1984	0.977	1.083	1.042	1.099	0.955	1.118	0.919	1.023
1985	0.991	1.092	1.003	1.124	0.970	1.209	0.929	1.032
1986	1.005	1.093	0.954	1.081	1.028	1.181	0.903	1.033
1987	1.073	1.104	0.945	1.068	1.055	1.136	0.889	1.061
1988	1.163	1.120	0.976	1.047	1.066	1.108	0.863	1.101
1989	1.180	1.133	1.026	1.055	1.092	1.063	0.841	1.120
1990	1.154	1.129	0.994	1.055	1.047	1.029	0.821	1.098
1991	1.147	1.119	0.994	1.071	0.984	1.068	0.831	1.089
1992	1.136	1.094	0.986	1.061	0.968	1.124	0.837	1.077

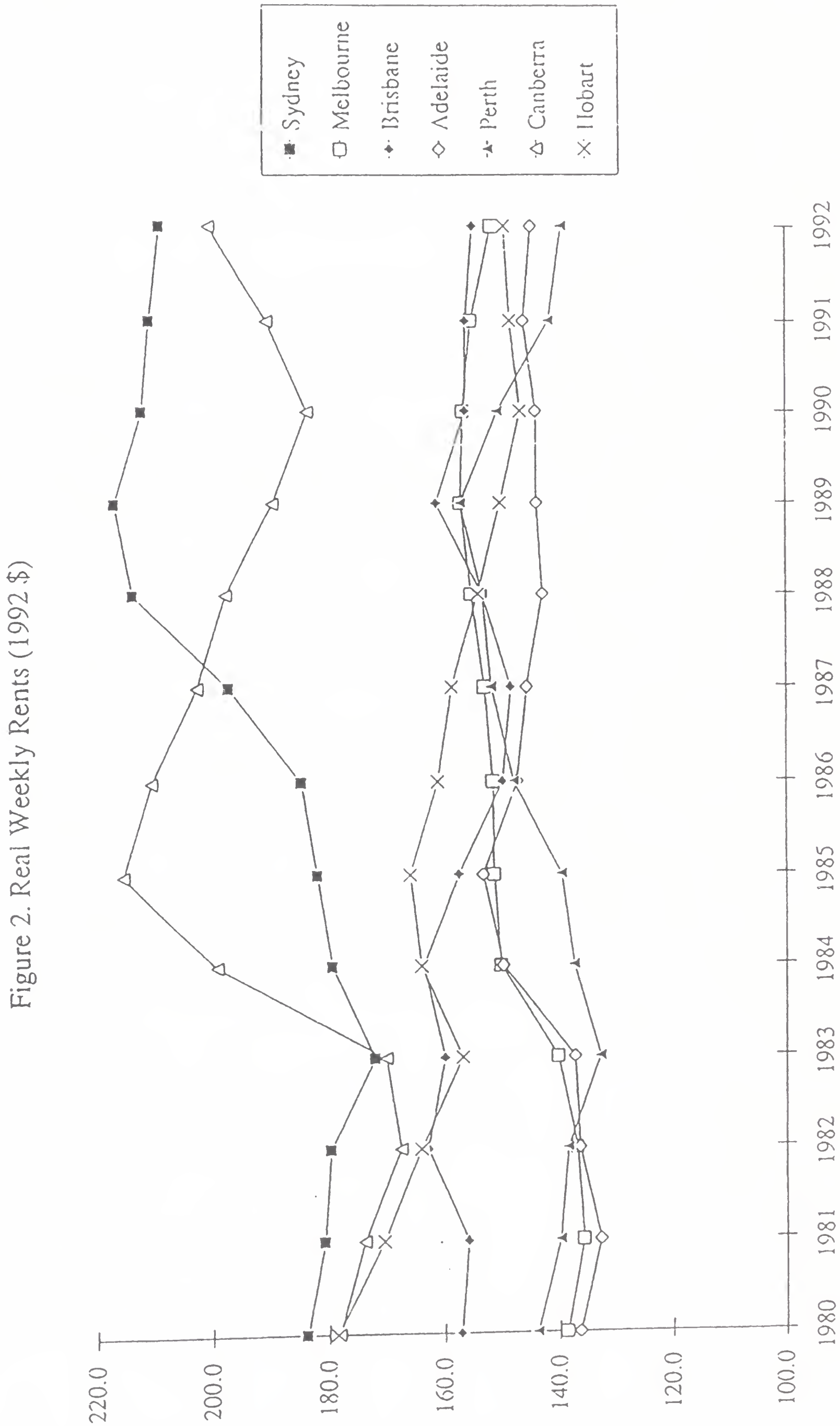


Figure 2. Real Weekly Rents (1992 $)

Table 2. Real Weekly Rents (1992 $)

Year	Sydney	Melbourne	Brisbane	Adelaide	Perth	Canberra	Hobart	Seven cities
1980	183.8	138.7	157.2	136.4	143.9	178.3	178.6	158.0
1981	180.8	135.8	156.0	132.8	139.9	173.9	170.6	154.9
1982	179.7	136.9	163.0	136.5	138.5	167.7	164.2	155.7
1983	172.1	140.2	160.1	137.3	132.8	170.2	156.9	153.2
1984	179.5	150.2	163.8	149.9	137.4	199.3	164.1	161.6
1985	182.1	151.5	157.6	153.4	139.6	215.6	166.0	163.1
1986	184.7	151.6	149.9	147.4	148.0	210.5	161.2	163.1
1987	197.2	153.1	148.5	145.7	151.9	202.6	158.7	167.6
1988	213.7	155.3	153.5	142.8	153.4	197.7	154.1	174.0
1989	217.0	157.2	161.4	143.9	157.2	189.5	150.2	176.9
1990	212.0	156.6	156.3	143.9	150.7	183.6	146.7	173.5
1991	210.7	155.2	156.2	146.0	141.6	190.4	148.4	172.1
1992	208.9	151.7	155.0	144.7	139.3	200.5	149.5	170.1

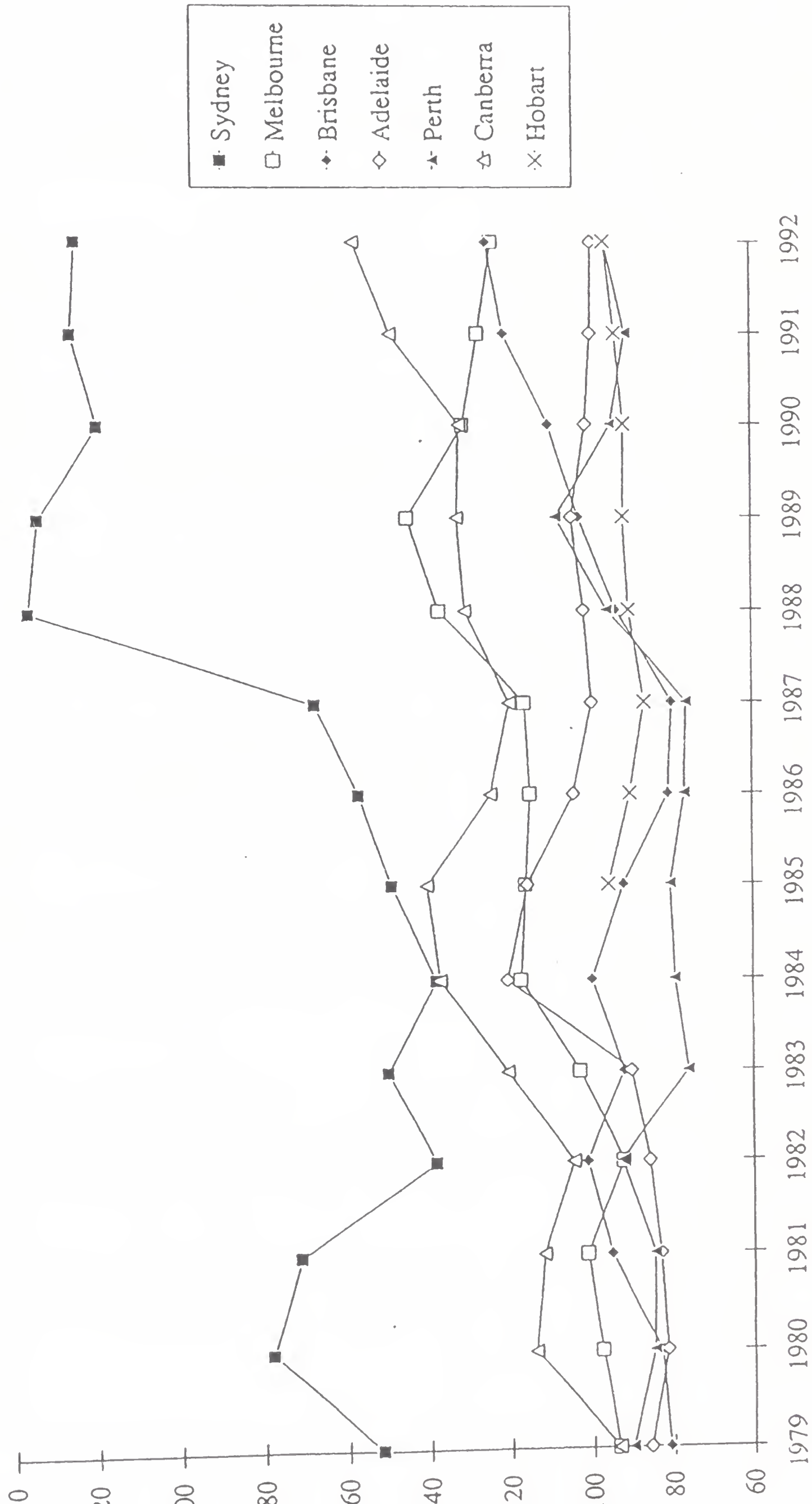


Figure 3. Real House Prices (1992 $1000s)

Table 3. Real House Prices (1992 $1000s)

Year	Sydney	Melbourne	Brisbane	Adelaide	Perth	Canberra	(Hobart)	Six cities
1979	151.8	93.7	81.0	85.8	90.3	93.7		110.6
1980	178.2	97.7	83.1	81.6	84.9	114.1		120.5
1981	171.4	101.2	95.3	83.3	84.7	112.0		120.8
1982	138.7	92.4	101.2	86.0	92.6	104.7		108.9
1983	150.2	103.0	92.1	90.3	76.1	120.8		113.7
1984	138.5	117.4	99.9	120.8	79.5	137.5		118.9
1985	149.2	116.1	92.0	115.7	80.5	140.5	95.8	120.9
1986	157.1	114.9	80.8	104.2	76.8	124.7	90.4	119.8
1987	167.7	116.2	80.0	99.7	76.5	120.1	86.8	123.0
1988	236.5	137.2	93.7	101.5	95.8	130.9	90.4	156.9
1989	234.2	144.9	102.7	104.4	108.3	132.8	91.8	161.3
1990	219.7	131.2	110.1	100.9	94.6	132.1	91.4	151.3
1991	226.1	127.4	121.0	99.5	90.9	148.8	93.7	153.6
1992	224.9	123.7	125.3	99.2	96.0	157.8	96.1	153.4

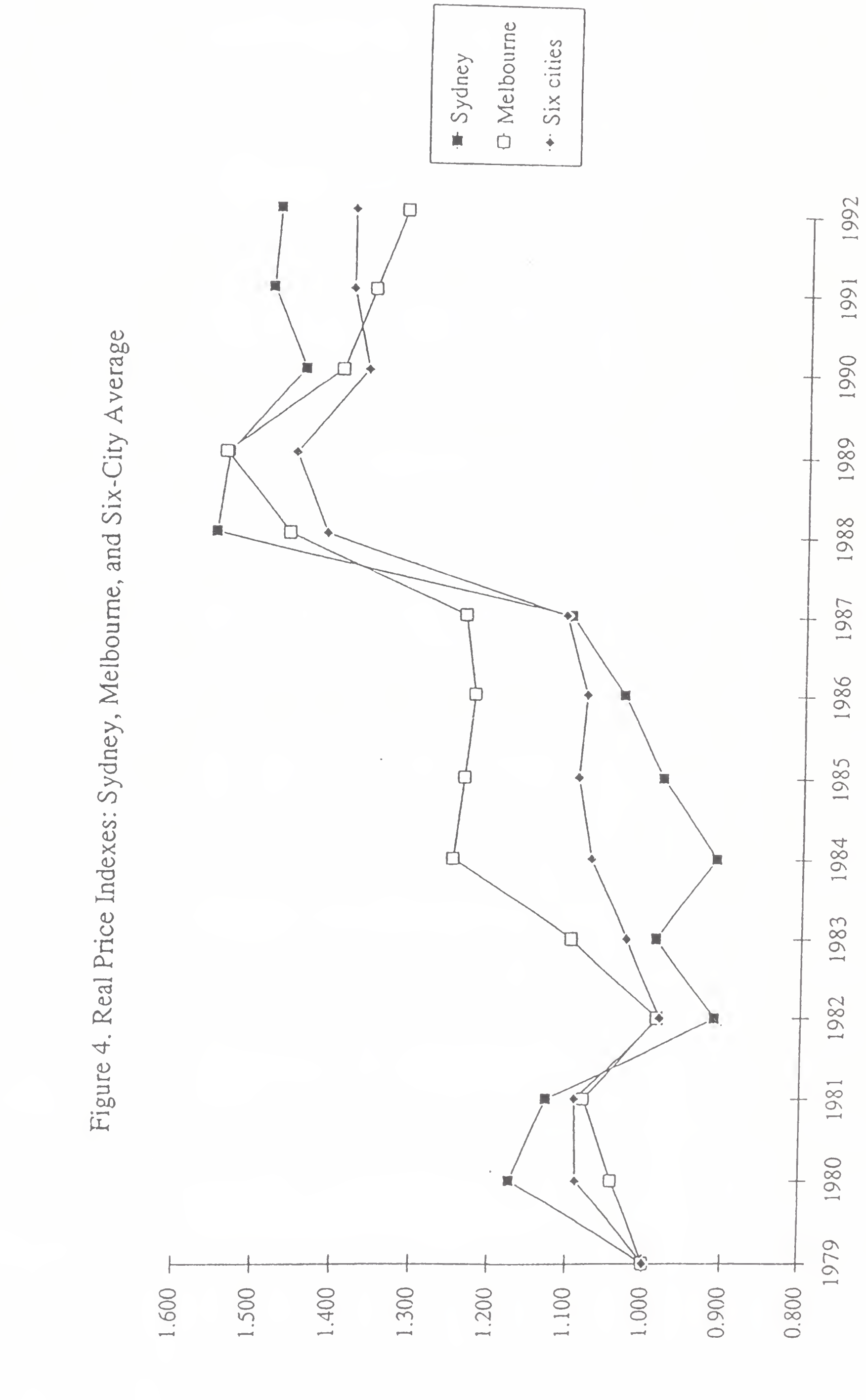


Figure 4. Real Price Indexes: Sydney, Melboume, and Six-City Average

Table 4. Real House Price Indexes (1979=1; Hobart: 1985=1)

Year	Sydney	Melbourne	Brisbane	Adelaide	Perth	Canberra	(Hobart)	Six cities
1979	1.000	1.000	1.000	1.000	1.000	1.000		1.000
1980	1.174	1.043	1.026	0.951	0.940	1.219		1.089
1981	1.129	1.081	1.175	0.971	0.938	1.196		1.092
1982	0.913	0.987	1.249	1.002	1.025	1.117		0.984
1983	0.989	1.100	1.137	1.052	0.842	1.290		1.028
1984	0.912	1.253	1.233	1.408	0.880	1.468		1.075
1985	0.983	1.240	1.136	1.348	0.891	1.500	1.000	1.093
1986	1.034	1.227	0.998	1.214	0.850	1.332	0.943	1.083
1987	1.104	1.240	0.987	1.162	0.846	1.282	0.906	1.112
1988	1.557	1.465	1.156	1.183	1.061	1.397	0.944	1.418
1989	1.542	1.547	1.268	1.217	1.198	1.418	0.959	1.458
1990	1.447	1.400	1.358	1.176	1.047	1.410	0.955	1.368
1991	1.489	1.360	1.493	1.160	1.006	1.589	0.978	1.388
1992	1.481	1.321	1.546	1.157	1.063	1.685	1.003	1.387

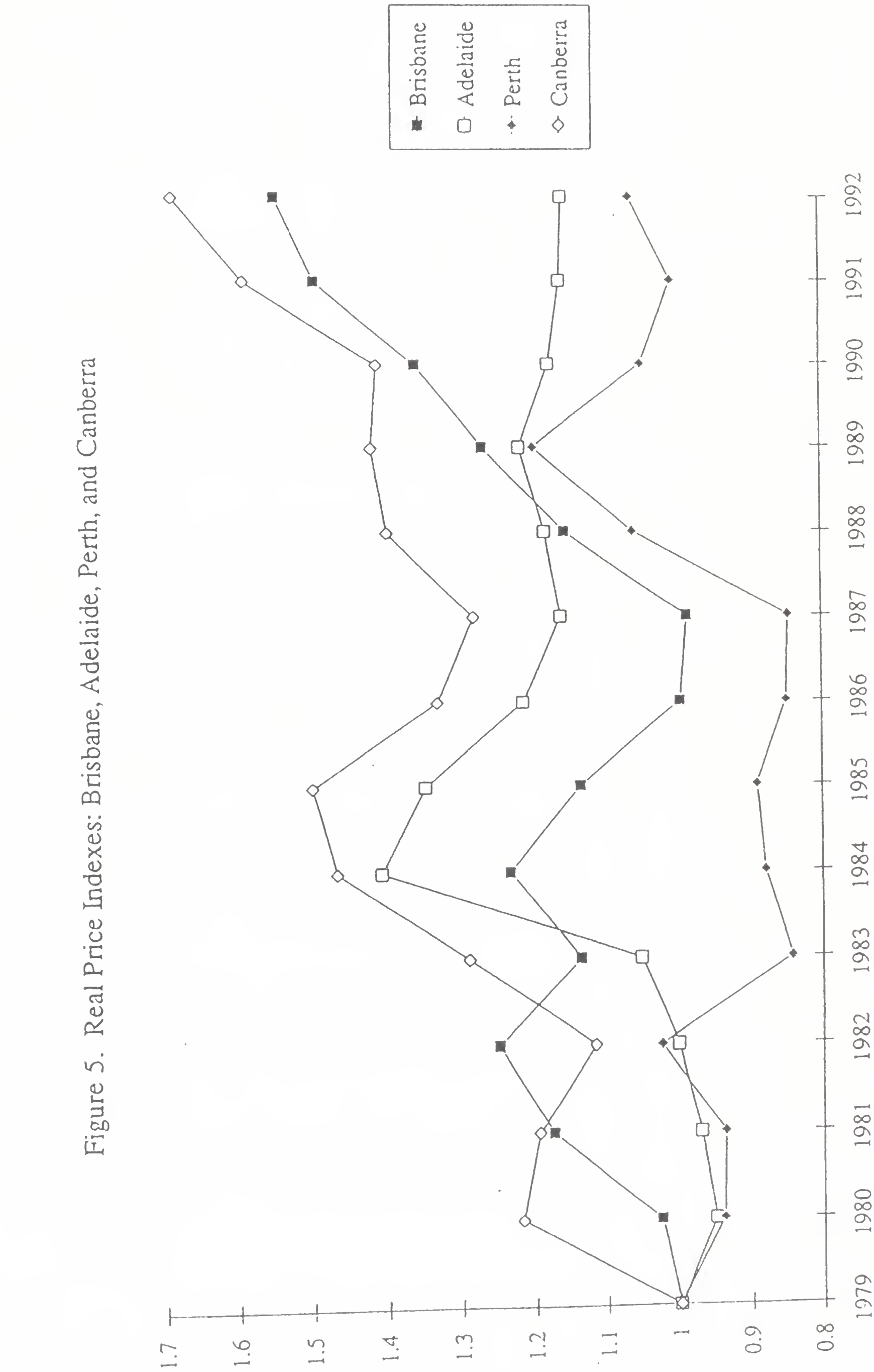


Figure 5. Real Price Indexes: Brisbane, Adelaide, Perth, and Canberra

Figure 6. Interest and Inflation Rates

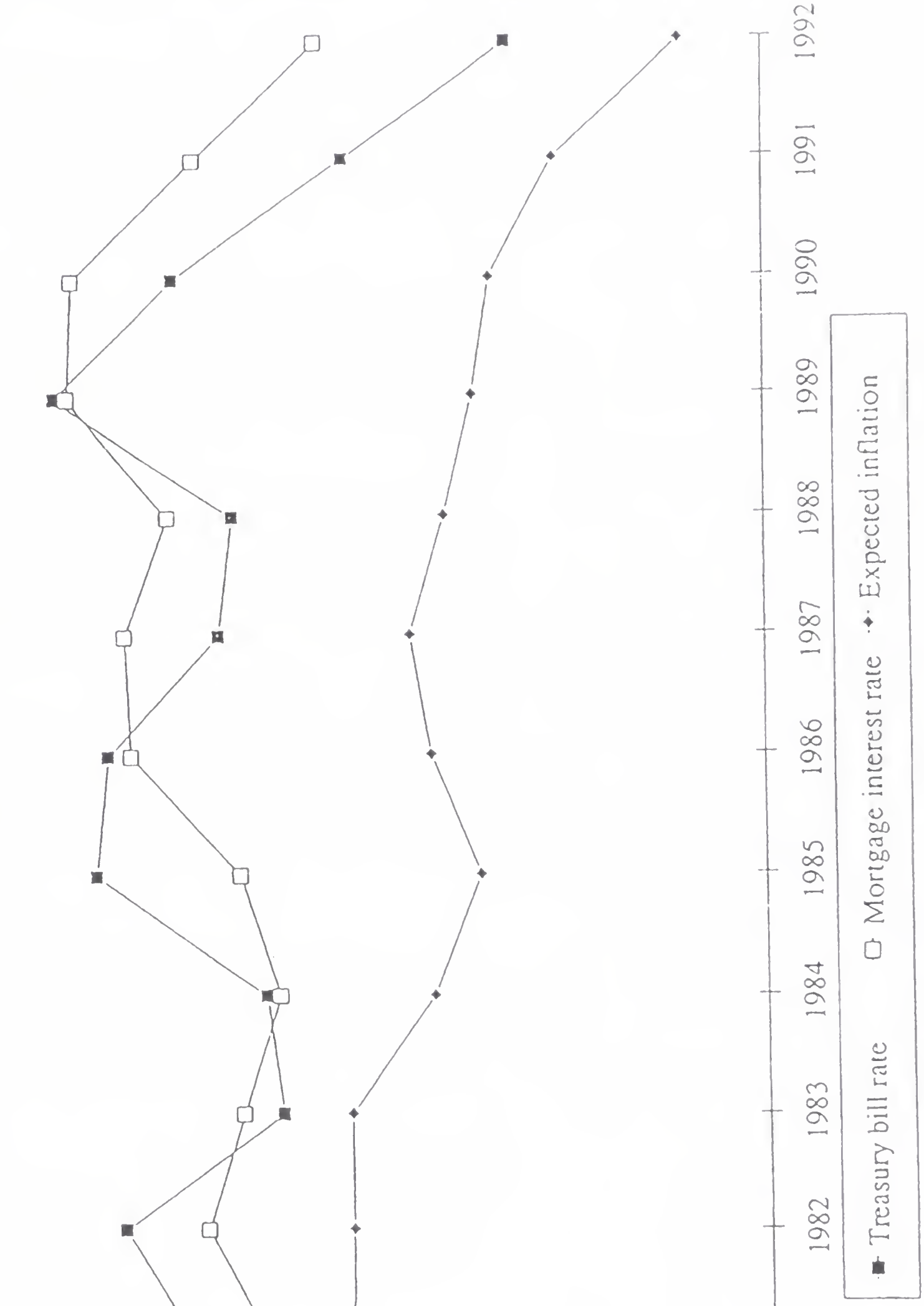
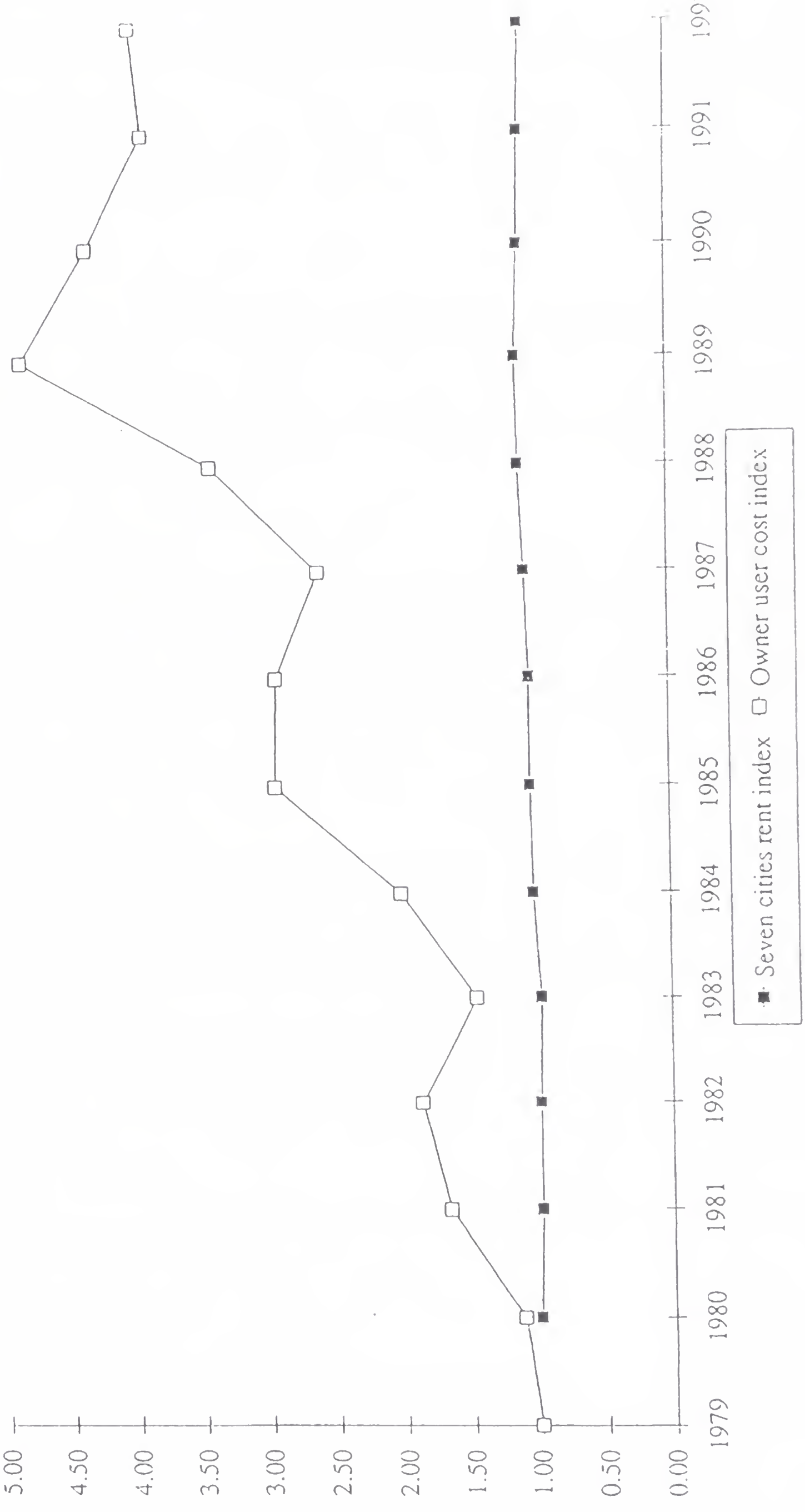


Table 5. User Cost Calculations

Year	Treasury bill rate	Mortgage interest rate	Actual inflation	Expected inflation	User cost per $1 invested	Real CQHP (a)	Annual user cost
1979	0.092	0.095	0.097	0.091	0.036	111586	3967
1980	0.110	0.105	0.105	0.101	0.037	122001	4464
1981	0.136	0.118	0.093	0.099	0.054	122607	6617
1982	0.153	0.133	0.104	0.098	0.067	110243	7429
1983	0.115	0.124	0.093	0.098	0.050	114913	5788
1984	0.118	0.115	0.064	0.078	0.067	119302	7972
1985	0.159	0.124	0.070	0.067	0.096	121191	11643
1986	0.156	0.150	0.087	0.079	0.096	120171	11593
1987	0.129	0.151	0.080	0.084	0.083	123693	10318
1988	0.125	0.141	0.071	0.075	0.085	158641	13517
1989	0.168	0.165	0.066	0.069	0.118	162846	19225
1990	0.139	0.164	0.062	0.064	0.112	153541	17223
1991	0.099	0.134	0.036	0.049	0.099	156435	15511
1992	0.060	0.105	0.003	0.019	0.102	156307	15884

Note: (a) CQHP = constant quality house price.

Figure 7. User Costs Versus Real Rents



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