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THE MARGINAL PRODUCTS OF RESIDENTIAL AND NON-RESIDENTIAL CAPITAL  
THROUGH 2009

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Working Paper 15897  
<http://www.nber.org/papers/w15897>

NATIONAL BUREAU OF ECONOMIC RESEARCH  
1050 Massachusetts Avenue  
Cambridge, MA 02138  
April 2010

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NBER Working Paper No. 15897  
April 2010. "Tgxkugf "F gego dgt "4232  
JEL No. E22,O47

### **ABSTRACT**

Estimates of the marginal product of capital can help forecast economic growth, test competing business cycle theories, and perform cost-benefit analysis. This paper presents annual and quarterly estimates of the marginal product of capital in the U.S. separately for the residential and non-residential sectors. The two sectors had positively correlated marginal products until the 2000s, when the residential marginal product fell during the housing boom, and rose during the housing bust. By the end of 2009, the residential MPK was back to the level of the 1990s. The Great Recession and recovery saw the non-residential MPK fall from historically high values to historically low ones, and then increase much of the way back.

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An online appendix is available at:  
<http://www.nber.org/data-appendix/w15897>

## **I. Introduction**

Economic theory suggests that marginal product of capital series might help predict economic growth forward one or two years, even under abnormal conditions such as wartime or depression. In some situations, the marginal product of capital is an essential ingredient in cost-benefit analyses (Harberger 1968; Byatt, et al., 2006; Mityakov and Ruehl, 2009). Evidence on the marginal product of capital can also help test various explanations for business cycles, help identify causes and consequences of the recent housing “bubble,” and help quantify the economic burdens of business taxes. The purpose of this paper is to produce annual and quarterly estimates of the marginal product of capital (net of depreciation), one each for the residential and nonresidential sectors of the U.S. economy.

By definition, the marginal product of capital net of depreciation is the change in net domestic product (NDP) during the accounting period (e.g., one quarter) that would result from an increase in the beginning-of-period capital stock of \$1 worth of capital, holding constant the total supply of all other factors. The additional \$1 of capital is assumed to have the same composition as the rest of the capital stock. For example, if the economy’s capital consisted of 400 identical structures and 100 identical vehicles, each of which cost \$2 to acquire, then the marginal product of capital would be the extra NDP attained by starting the quarter with 400.4 identical structures and 100.1 identical vehicles (that is, \$0.80 worth of structures and \$0.20 worth of vehicles).

Suppose that origins of the current recession could be traced back to limits on the supply of aggregate investment due to a “credit crunch.” (Real investment did fall through the first year and a half of this recession.) The credit crunch theory says that the marginal product of capital would rise over this period as a consequence of the increased cost of capital faced by those with new capital projects. Alternatively, a financial crisis or something else could reduce labor usage more directly, and, given the

complementarity of labor and non-residential capital in production, a fall in non-residential investment would merely result from *low* marginal products of capital, thereby putting the non-residential capital stock on a path that is consistent with a lesser amount of labor usage (Mulligan, 2010).

The marginal product of capital is also interesting as an aggregate leading indicator of business conditions, which is the motivation for its use in a number of studies (e.g., Feldstein and Summers (1977), Auerbach (1983)). This relationship alone may make it a predictor of subsequent economic growth.

Additionally, Fisherian consumption-saving theory suggests that the marginal product of capital, or variations of it, should predict consumption growth. In a Robinson Crusoe economy, the consumer would save for the future by reducing current consumption and using the proceeds to build capital assets. She would then use the marginal product and capital gains from those assets to add to consumption in the future. Because the saving decision is made in the present while the principal and interest are spent in an uncertain future, the incentive to save depends on, among other things, the expected marginal product and expected capital gains. The current marginal product itself helps predict the incentive to save only to the extent that it is closely related to the expected sum of future marginal product and capital gains. For this reason, we present measures of the marginal product that might be more indicative of those expected gains, and (consistent with national accounting practices: see Fraumeni, 1997) measures of depreciation that reflect expected depreciation and obsolescence, rather than actual depreciation and obsolescence.

It is helpful to examine the marginal product of residential capital separately from the marginal product of non-residential capital for at least two reasons. For one, the aggregate demand for labor is expected to have a closer relationship with the stock of non-residential capital than the stock of houses, because workers use non-residential capital in doing their jobs. Additionally, some important capital market distortions – such as business taxes and the “housing bubble” – are expected to have opposite effects on the stocks of residential and non-residential capital, and thereby opposite effects on their marginal products.

Section II presents our methods for calculating annual marginal products, and discusses the findings for 1930-2009. The marginal product of capital is very different in the residential and non-residential sectors, both in terms of levels and fluctuations. Section III examines the importance of taxes in explaining the gap between marginal products in the two sectors. The methods and results for quarterly postwar marginal products through 2009-IV are presented in Section IV. In order to isolate some of the possible determinants of measured marginal products, Section V compares them with average products. Section VI concludes, and Appendices record the time series values discussed in the body of the paper.

## **II. Aggregate Annual Marginal Products**

In a competitive capital market with constant returns to scale, the marginal product of capital is simply the income accruing to domestically employed capital divided by the amount of capital employed at the beginning of the accounting period, valued at replacement cost. Computing this measure entails a couple of minor hurdles. First, the location of capital income may not match the location of capital. For example, national income is the income of citizens, while the capital stock, measured as accumulated domestic investment, comprises the capital located on home soil, regardless of the nationality of its owners. We account for this by focusing on domestic measures of both the income and stock of capital, or estimating them when necessary.

Second, national accounts do not disaggregate non-corporate business incomes into labor and capital income. We account for this by assuming that the capital income share for non-corporate business is the same as for corporate business. Third, neither government capital income nor government nonresidential capital is recorded in the national accounts. Thus, our non-residential estimates consider private sector stocks and flows only.

A final hurdle arises because capital income is a flow, the price level of which changes throughout the accounting period. To account for this in our calculation of

annual real capital income, we discount time  $t$  flows back to the  $t-1$  price level using the annual PCE deflator.

The period  $t$  net-of-depreciation marginal product of residential capital  $MPH_t$  is calculated using three entries from the NIPAs (the PCE deflator, nominal net housing value added<sup>2</sup>, and nominal compensation of employees in housing) and one entry from the fixed asset tables (current-cost stock of residential structures):

$$MPH_t = \frac{(\text{net housing value added})_t - (\text{compensation of HH sector employees})_t}{(\text{residential structures, current cost})_{t-1}} \frac{P_{t-1}}{P_t}$$

$$(\text{net housing value added})_t \equiv (\text{PCE housing services})_t - (\text{housing intermediates})_t - (\text{residential structures depreciation})_t$$

$$P_t \equiv (\text{PCE deflator})_t$$

where net housing value added is PCE housing services minus housing intermediates and depreciation.<sup>3</sup>

The period  $t$  net-of-depreciation marginal product of private nonresidential capital is calculated using one entry from the fixed asset tables and ten entries from the NIPAs:

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<sup>2</sup> Net housing value added is not available for the most recent year. We estimate it by taking the average of the quarterly values that we estimate for the quarterly series—see Section III.

<sup>3</sup> Following Feldstein, Dicks-Mireaux, and Poterba (1983), our concept of the marginal product of capital is gross of all taxes (although, in practice, they did not attempt to add back any portion of state and local taxes or business transfer payments, other than property taxes): the concept is the effect of a unit of capital on national income or output, even the part accruing to tax authorities. Since we have calculated net marginal product of residential (non-residential) capital by making subtractions from output (national income), rather than additions to capital income, we do not have to add business transfer payments or state and local taxes “back in.”

$$MPK_t = \frac{\alpha_t [NI_t + NFI_t - Egov_t] P_{t-1} / P_t - H_{t-1} MPH_t}{(private\ non-residential\ capital,\ current\ cost)_{t-1}}$$

$$1 - \alpha_t \equiv$$

$$\left( 1 - \frac{Tpr_t}{NI_t - Egov_t - Tout_t} \right) \frac{(Compensation\ of\ Private\ Sector\ Employees)_t}{NI_t - Egov_t - Tout_t - Tpr_t - (Proprietor's\ Income)_t}$$

$$NI_t \equiv (National\ Income)_t$$

$$NFI_t \equiv (Net\ Factor\ Income\ paid\ to\ the\ rest\ of\ the\ world)_t$$

$$Egov_t \equiv (Compensation\ of\ Government\ Employees)_t$$

$$H_{t-1} \equiv (residential\ structures,\ current\ cost)_{t-1}$$

$$Tpr_t \equiv (property\ tax\ payments)_t$$

$$Tpr_t + Tout_t \equiv (taxes\ on\ production\ \&\ imports)_t + (business\ current\ transfer\ payments)_t$$

$$-(subsidies)_t + (surplus\ of\ government\ enterprises)_t$$

$\alpha$  is capital's share of factor income, so  $\alpha$  times private national domestic income (NDI – Egov) is private domestic capital's income.<sup>4</sup> The term in square brackets is the income accruing to domestically and privately employed nonresidential capital.

Figure 1 displays both the residential and nonresidential net-of-depreciation marginal products of capital (MPKs), calculated as outlined above. From the late 1950s through the late 1970s, the two series display strong positive correlation, with a smaller degree of correlation during the 1980s and 1990s. However, starting in 2001, the series display strong negative correlation.

The non-residential MPK has many ups and downs. In contrast, prior to the most recent cycle, the postwar residential MPK series seems to have only five phases in 70 years: a downward trend in the 1930s and 1940s, an up trend 1948-64, a downtrend 1964-80, an up trend 1980-92, and a flat period during the 1990s.

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<sup>4</sup> Proprietor's income and *Tout* (*Tout* is essentially indirect taxes and business fees paid to government) are assumed to be divided among capital and labor in the same proportions as the rest of private domestic income. Property taxes are assigned to pre-tax capital income, and allocated to the proprietor's sector in proportion to the rest of private domestic national income.

As shown in more detail in Figure 2, the residential MPK shows a steep decline,<sup>5</sup> while the nonresidential MPK rises, during the period of buildup in housing generally associated with the housing “bubble” (2001-2006). Then, after the housing cycle peak, both series change direction, with the nonresidential MPK falling in 2007 for the first time since 2001 and the residential MPK halting its steep four-year decline. These changes coincide with a sharp fall in construction of new housing and a corresponding pickup in investment in nonresidential structures (Mulligan and Threinen, 2008).

### **III. Tax Policy and Distortions between Residential and Nonresidential Capital**

The axes’ scales in Figure 1 show a dramatic difference between the measured marginal products of residential and nonresidential capital in a typical year. On average from 1970-2000, the marginal product of residential capital was only 5.8 percent per year, whereas the marginal product of non-residential capital was more than double – about 13.9 percent per year.

Mismeasurement could cause the two measured marginal products to be different, although the direction of the measurement bias is ambiguous. For example, intangible capital (Griliches, 1981) is excluded from our capital stock measures and may be differentially important in the non-residential sector. On the other hand, land values are also excluded from our capital stock measures, and residential capital may be especially land intensive.

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<sup>5</sup> The fall in marginal product of residential capital in 2005 is partly explained by Hurricanes Katrina and Rita, the effects of which should ideally be excluded from estimates of expected marginal product. For this reason, values for the quarterly series below will be interpolated for the year 2005.



Indirect taxes (such as sales and excise taxes) and income taxes are expected to cause the gross-of-tax marginal product of non-residential capital to significantly exceed the marginal product of residential capital, because investors are presumed to require similar after-tax returns from their investments in the two sectors.<sup>6</sup> In order to calculate the magnitude of these effects, we calculate an average after-tax return for non-residential capital by adjusting for indirect and income taxes that do not apply to housing, and compare the tax-adjusted MPK to MPH.

New homes owe essentially zero sales and excise taxes, and the imputed services to owner-occupied housing are not subject to sales, excise, or income tax. Landlords typically do not owe sales or excise tax on the rents they receive, as long as the rental period is more than a few months. Indirect taxes are paid by non-residential businesses, so we subtract capital's share of those taxes from gross-of-tax non-residential capital income,<sup>7</sup> and make no subtraction from residential output. Figure 3's solid and dashed blue series shows the gap between MPK and MPK gross of taxes (that is, as shown in Figures 1 and 2) and adjusted for indirect taxes, respectively. On average from 1970-2000, the indirect-tax-adjusted gap is 6.9 percent per year, as compared to 8.1 percent per year for the gross-of-tax gap.

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<sup>6</sup> Property taxes are levied on both residential and non-residential property, and national accounts data show that owner-occupied housing's share of property taxes paid is similar to its share of the total capital stock (residential and non-residential).

<sup>7</sup> If capital could be freely moved between the residential and non-residential sectors to equalize after tax returns, then sales taxes on non-residential output would create a wedge between MPH and MPK equal to the product of the sales tax rate and capital's share of income in the non-residential sector. We measure "indirect taxes" as the difference between "taxes on production and imports less subsidies plus business current transfer payments" and property taxes, so our measure includes excise taxes, customs taxes, business license fees, and some even smaller items.

We consider three alternative adjustments for federal and state individual and corporate income taxes. Two of them assume a marginal income tax rate (35 and 50 percent, respectively), and calculate marginal non-residential capital income taxes as the product of that rate and the MPK adjusted for indirect taxes.<sup>8</sup> The assumed rate is intended to represent the combination of corporate taxes and the individual income taxes owed by business owners on their business income. A larger assumed rate is appropriate to the extent that capital is owned by taxable corporations and/or the business owners are in relatively high personal income tax brackets.

Figure 3 shows two of the income tax adjustments, and how the combined adjustment leaves a gap that is closer to zero than to the gross-of-tax gap. On average from 1970-2000, the gaps using the 35 and 50 percent marginal income tax rates are 2.7 and 0.7 percent per year,<sup>9</sup> respectively. Given that the gross-of-tax gap was 8.1 percent per year, it seems that most of that gap can be explained by the collection of various taxes on non-residential business activity that are not collected in the residential sector.<sup>10</sup>

#### **IV. Quarterly Marginal Products**

Parts of the gross-of-tax calculations described above can be duplicated directly to produce quarterly series. However, because the BEA estimates capital stocks and certain other series only on an annual basis, quarterly measurement of the marginal products of capital require estimates of the quarterly evolution of those series.

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<sup>8</sup> Some housing output is taxed by the personal income tax because some of the housing (less than a quarter) is owner by businesses, so in principle the MPH should be income tax adjusted too. However, the adjustment may be small because businesses own so little of the housing and because business may use rental housing to shelter other income from taxes.

<sup>9</sup> A third alternative assumes that the combined corporate and individual income tax burden is the same in the corporate and noncorporate non-residential sectors, and that each dollar of corporate income tax collected on corporate income is associated with a dollar of individual income tax collected on distributions to corporate equity and debt holders, thereby subtracting twice the ratio of corporate income tax revenue to corporate capital from the sales-tax adjusted MPK. The result is gap of -0.4 percent per year.

<sup>10</sup> Feldstein, Dicks-Mireaux, and Poterba (1983) calculated a marginal product of capital that was gross of property taxes but net of *all* indirect taxes and business transfer payments (not just labor's share of them). Their tax treatment amounts to what we have considered the MPK "net of indirect tax" (see the dashed blue series in our Figure 3). They also included measured capital to include the value of land, which would further reduce the measured MPK by about 20 percent.

### *III.A. Residential Capital*

Our first step in producing the quarterly residential marginal product of capital series (gross of tax) was to estimate the evolution of the net real residential capital stock by quarter. This was done by allocating the annual change in the real net stock in a given year across quarters in the same proportions as real gross residential investment during the same year. The second step was to inflate this real series to create a scaled nominal series, which was done using the residential investment price index. Finally, the annual change in the current cost residential capital stock was allocated across the quarters of a given year in the same proportions as changes in the scaled nominal series (produced in step two) over the quarters of that year.

Furthermore, the annual series lack published values for the most recent year. In order to estimate the real capital stock for the most recent year, it was assumed that a given gross real residential investment in a quarter affected the real net capital stock in the same way during the most recent year as it was estimated to have done in the last published year. That is, for the most recent year,

$$\text{RealResCapStock}_t = \text{RealResCapStock}_{t-1} + (\text{GrRealResInv}_t / \text{GrRealResInv}_{t-4}) * (\text{GrRealResInv}_{t-4} / \text{TotalResInv}) * (\Delta \text{RealResCapStock})$$

where  $\text{RealResCapStock}_t$  is the real residential capital stock in quarter  $t$ ,  $\text{GrRealResInv}_t$  is the gross real residential investment in quarter  $t$ ,  $\text{TotalResInv}$  is the total real gross residential investment during the most recent published year, and  $\Delta \text{RealResCapStock}$  is the change in the net real residential capital stock between the two most recently published years.

This real series was then inflated using the residential investment price index. Finally, the scaled nominal series was converted to the final estimate by assuming that changes in the scaled series and corresponding changes in the final series occurred in the same proportion during the last published year and the most recent year.

Similar issues affected estimation of the income series. The net housing value added series, which was used in the calculation of annual residential capital income, also

appears only on an annual basis. Quarterly housing value added was estimated by allocating the annual net housing value added, less compensation of employees, across the four quarters of a given year in the same proportions as nominal personal consumption expenditures on housing during that year. For quarters of the final year of the series, it was assumed that year-over-year residential capital income increased at the same rate as year-over-year nominal personal consumption expenditures on housing. That is, for the most recent year,

$$\text{ResCapInc}_t = \text{ResCapInc}_{t-4} * (\text{PCEHousing}_t / \text{PCEHousing}_{t-4})$$

where  $\text{ResCapInc}_t$  is the estimated residential capital income in quarter  $t$  and  $\text{PCEHousing}_t$  is nominal personal consumption expenditures on housing in quarter  $t$ .

Finally, net capital income in 2005 (in particular, depreciation) was strongly affected by Hurricanes Katrina and Rita, so estimates produced by the above method would not be a suitable measure of expected capital income for that year. As a result, the marginal products of capital for the four quarters of 2005 are linearly interpolated between 2004:Q4 and 2006:Q1.

### *III.B. Nonresidential Capital*

The quarterly series for the nonresidential marginal product of capital was constructed using the same basic formula as the annual series given above. The numerator of that formula can be applied directly because each of the needed series is available on a quarterly basis. As a result, only the quarterly evolution the nonresidential capital stock series required any modification from the original formula.

This estimation of the quarterly evolution of the net nonresidential capital stock was done in a manner analogous to the approach outlined above for the quarterly residential series. The annual change in the real net stock in a given year was allocated across quarters in the same proportions as real gross nonresidential investment during the same year. Next, this real series was inflated to create a scaled nominal series, which was done using the nonresidential investment price index. Finally, the annual change in the current cost nonresidential capital stock was allocated across the quarters of a given year

in the same proportions as changes in the scaled nominal series over the quarters of that year.

As was the case with the residential data, the annual series lack published values for the most recent year. In order to estimate the real capital stock for the most recent year, it was assumed that a given gross real nonresidential investment in a quarter affected the real net capital stock in the same way during the most recent year as it was estimated to have done in the last published year. Finally, the scaled nominal series was converted to the final estimate by assuming that changes in the scaled series and corresponding changes in the final series occurred in the same proportion during the last published year and the most recent year. This is exactly the approach taken with the residential data.

Finally, as with the residential data, capital income in 2005 was strongly affected by extraordinary depreciation associated with Hurricanes Katrina and Rita, so the marginal products of capital for the four quarters of 2005 are linearly interpolated between 2004:Q4 and 2006:Q1.

### *III.C. Results*

Figure 4 displays both the residential and nonresidential net-of-depreciation marginal products of capital on a quarterly basis, calculated as outlined above, since 1947-I. In order to make some of the details more visible, Figure 5 shows the same series for the quarters 1990-I through 2009-IV. As expected, the same general trends that were evident in the annual series appear here. Figure 4 suggests that, with the exception of the most recent cycle, the residential MPK does not change as significantly over the business cycle as does the non-residential MPK, but has more significant decade-to-decade changes.<sup>11</sup>

The main facts of note in the quarterly series are, first, that the trends in both series since 2001 have been basically smooth across quarters, with a steady decline in the residential MPK followed by an increase starting in 2006 and the reverse trend in nonresidential MPK. Second, the increase in the residential MPK and the coincident

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<sup>11</sup> The relative cyclicity of the two series may be due to a greater complementarity of labor with business-sector capital, as opposed to housing.

decrease in the nonresidential MPK continued through 2009, although the non-residential MPK has reversed its trend in the two most recently available quarters (2009-III and -IV). The most recent residential MPK is also at least as high as its historical average, and near the highs of the 1990s, which suggests that residential investment may have hit its lows.

## V. Quarterly Average Products

A sector's marginal product of capital is that sector's capital income per dollar of capital, which can be decomposed into the product of the sector's capital share of income times the sector's income per dollar of capital. That is, the marginal product of capital is the product of capital's share and the average product of capital.

The average product of capital would be a better indicator of the marginal product of capital when measured capital share fluctuates mainly due to measurement error rather than genuine changes in the returns to labor and capital. For example, at high frequencies there may be lags in the recording of capital or labor income, as with severance payments that are made to a worker after he stops contributing to production. At low frequencies, labor unions may rise or fall, and labor unions may exercise their power by having some of the returns to capital reallocated toward themselves (Leontief, 1946). These are some of the reasons to examine measures of average products in addition to marginal products.

With the quarterly marginal product series already estimated, it is straightforward to compute the net average products of capital (APKs) in the two sectors. For the residential sector, the quarterly net value of housing services (including labor) was estimated using a formula analogous to the one used to estimate the quarterly net value added of housing services from residential capital. The net residential APK is then calculated by dividing this series by the already estimated quarterly residential capital stock.

For the nonresidential sector, we have

$$APK_t = (PNDI_t - ResVA_t) / (\text{private nonresidential fixed asset stock, current cost}),$$

where  $APK_t$  is the period  $t$  net average product of nonresidential capital,  $PNDI_t$  is the period  $t$  private net domestic income, and  $ResVA_t$  is the net residential value added (which was produced for the estimation of residential APK as outlined above).

Figure 6 displays both the residential and nonresidential net-of-depreciation average products of capital on a quarterly basis, calculated as outlined above. These series have a stronger correlation than the marginal series during the period from 1960-2000. However, they show the same divergence from 2001-2005 and partial reconvergence since 2006 that the MPK series suggests should have occurred. Additionally, as with the MPK series, the nonresidential APK is presently within its average range, while the residential APK remains below its average from the past two decades.

## VI. Conclusions

The marginal product of non-residential capital, net of depreciation, is more than double the marginal product of residential capital. Most of the marginal productivity gap between the two sectors can be explained by the fact that so much residential output escapes income and indirect business taxation.

Over the last ten years, the marginal and average products of residential capital fell, and then increased, as housing construction was booming and busting. In this sense, the residential data suggest that the supply of residential capital shifted along a relatively stable demand for the services of that capital. As indicated by the marginal product of residential capital at the end of 2009, current housing supply seems restricted by comparison with the housing boom (when the residential MPK was low), but fairly normal by comparison with the 1990s when the residential MPK was similar to what it was at the end of 2009.<sup>12</sup> These patterns are consistent with the findings of Davis, Lehnert, and Martin (2008) and others that housing rent-price ratios were low during the

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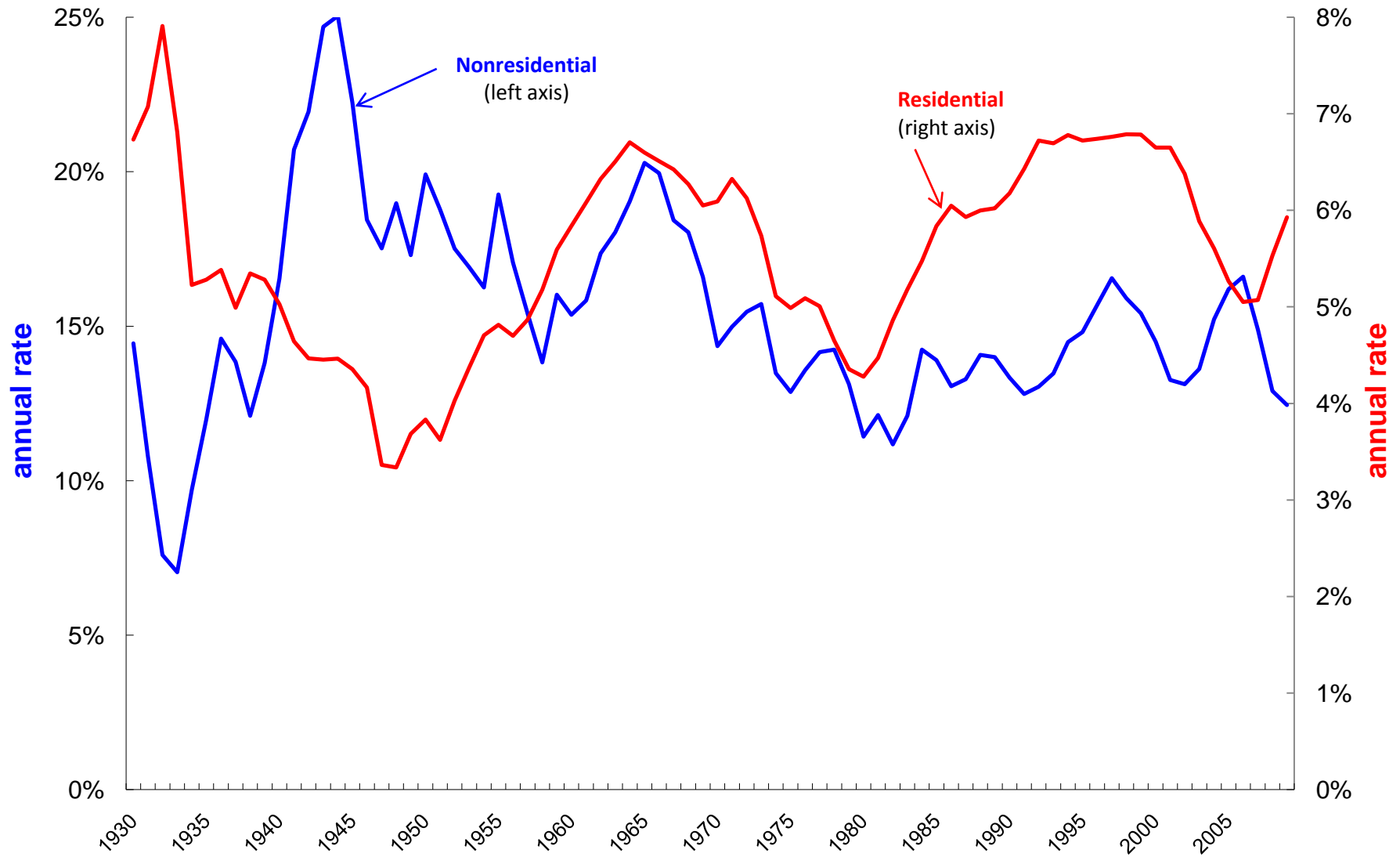
<sup>12</sup> Conversely, a marginal product of residential capital that significantly exceeded the levels of the 1990s would indicate housing supply conditions that are more restrictive than they were in the 1990s.

housing boom, and with the conclusions that the housing boom was fueled by optimistic expectations, or by easy credit.

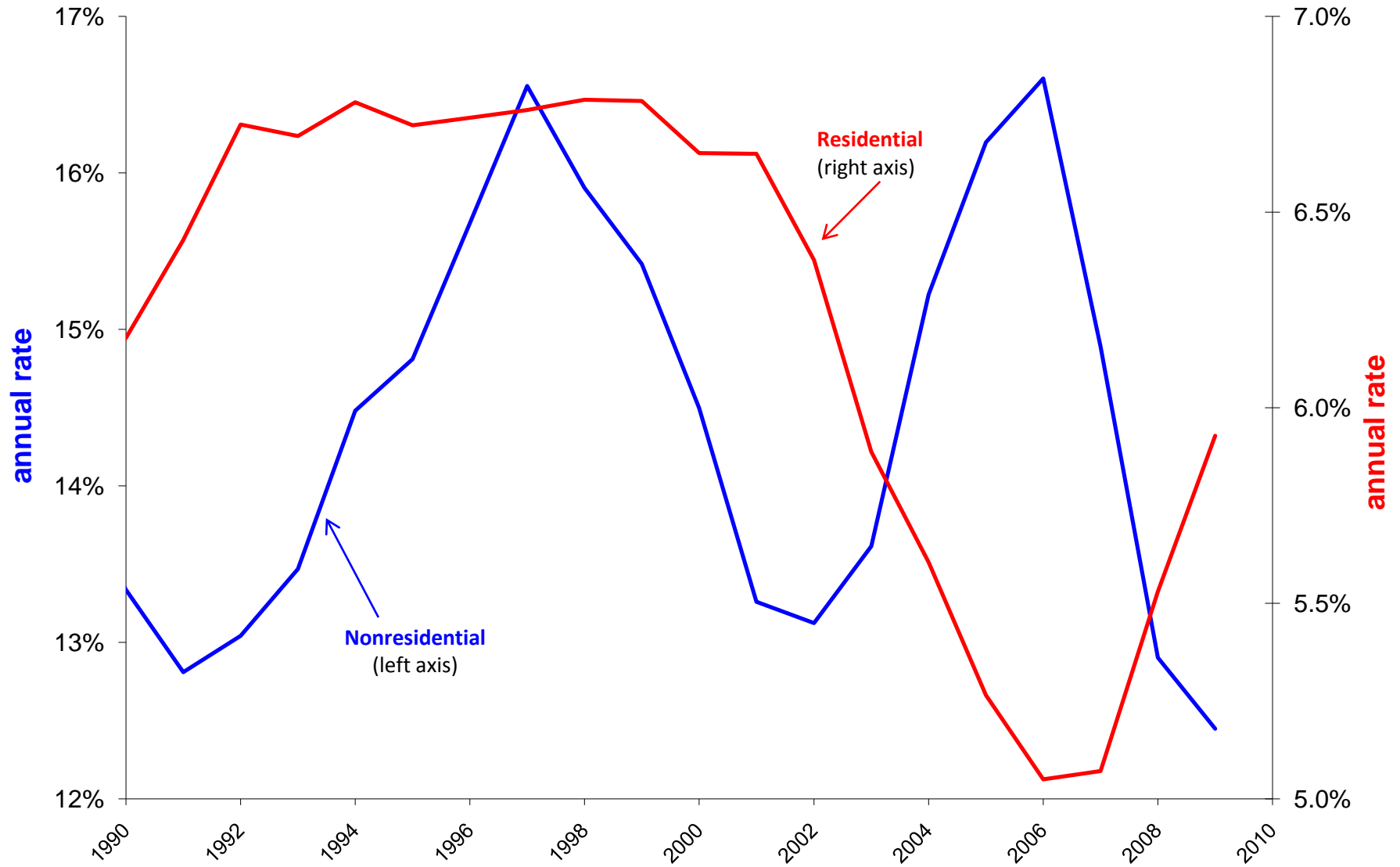
The marginal product of non-residential capital was much higher during the housing boom than it was during the recession, when rates of investment in non-residential equipment and software were low. In this sense, the supply of non-residential capital seems less restricted during the recession than it was before. In other words, the recession's investment rates may have been low because of a slack labor market, rather than the other way around (Mulligan, 2010). In any case, the testing of various theories of this recession, and the prior housing cycle, can be enhanced with marginal products data like those shown in this paper.



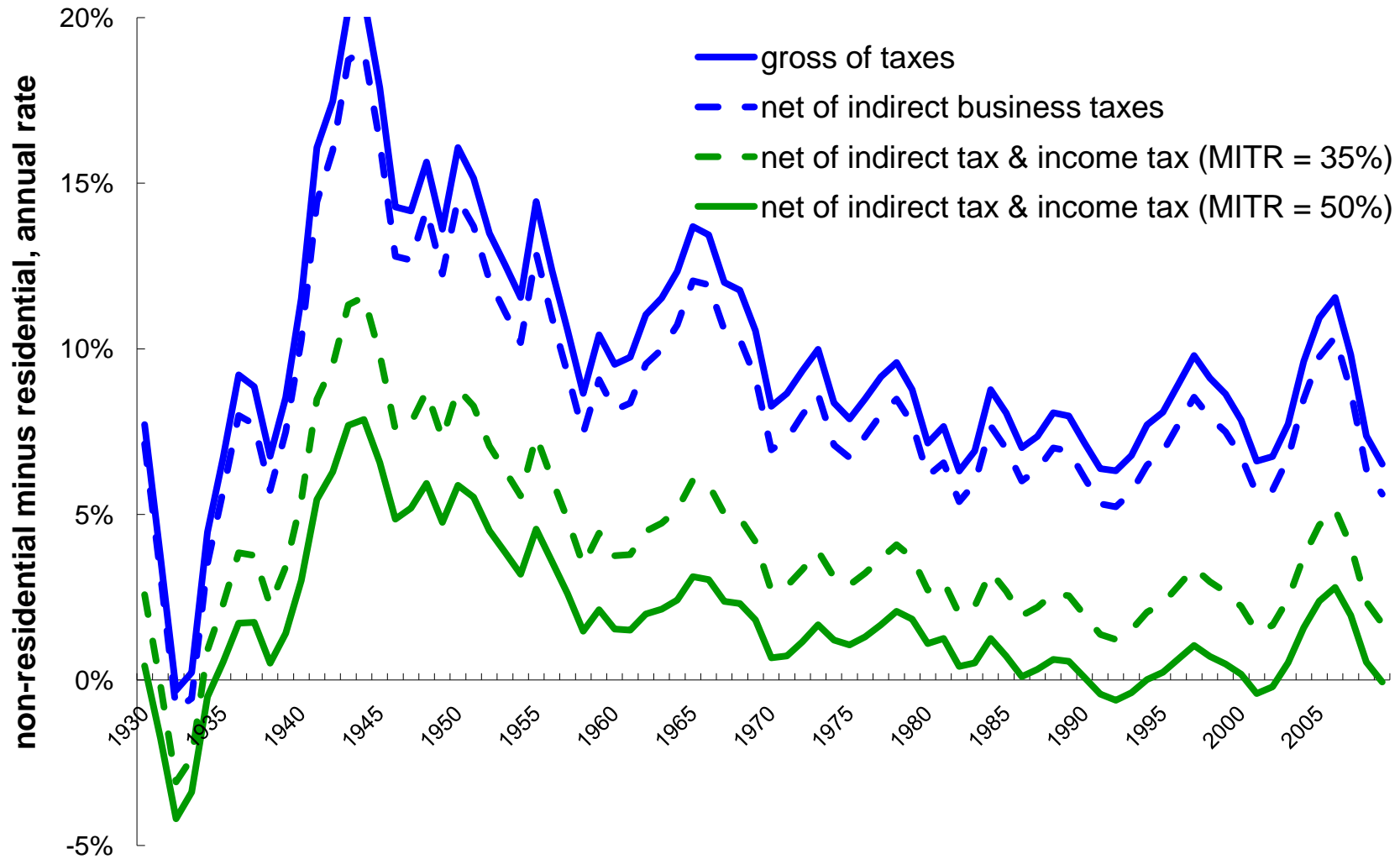
**Fig 1. The Marginal Product of Capital, 1930-2009**



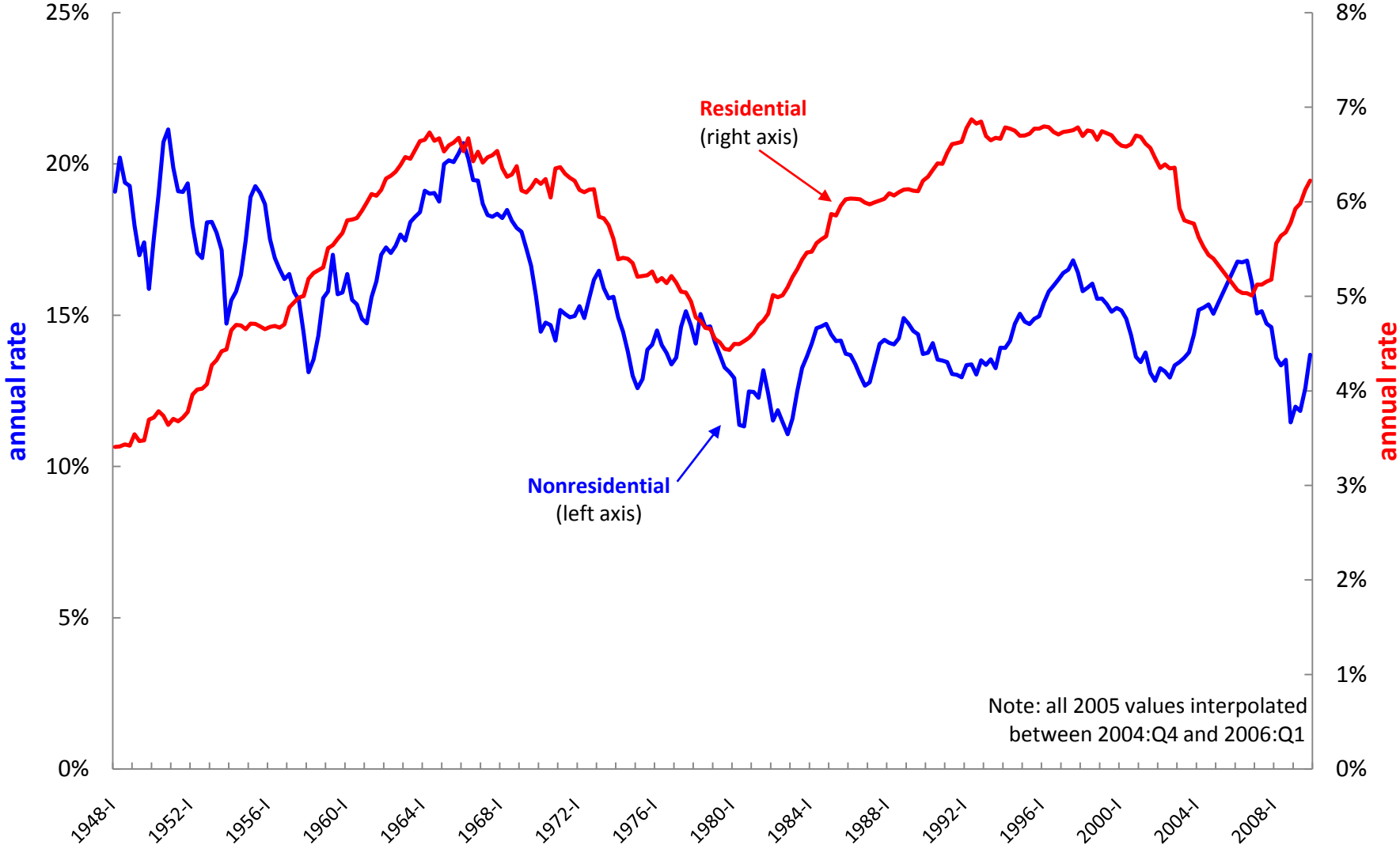
**Fig 2. The Marginal Product of Capital, 1990-2009**



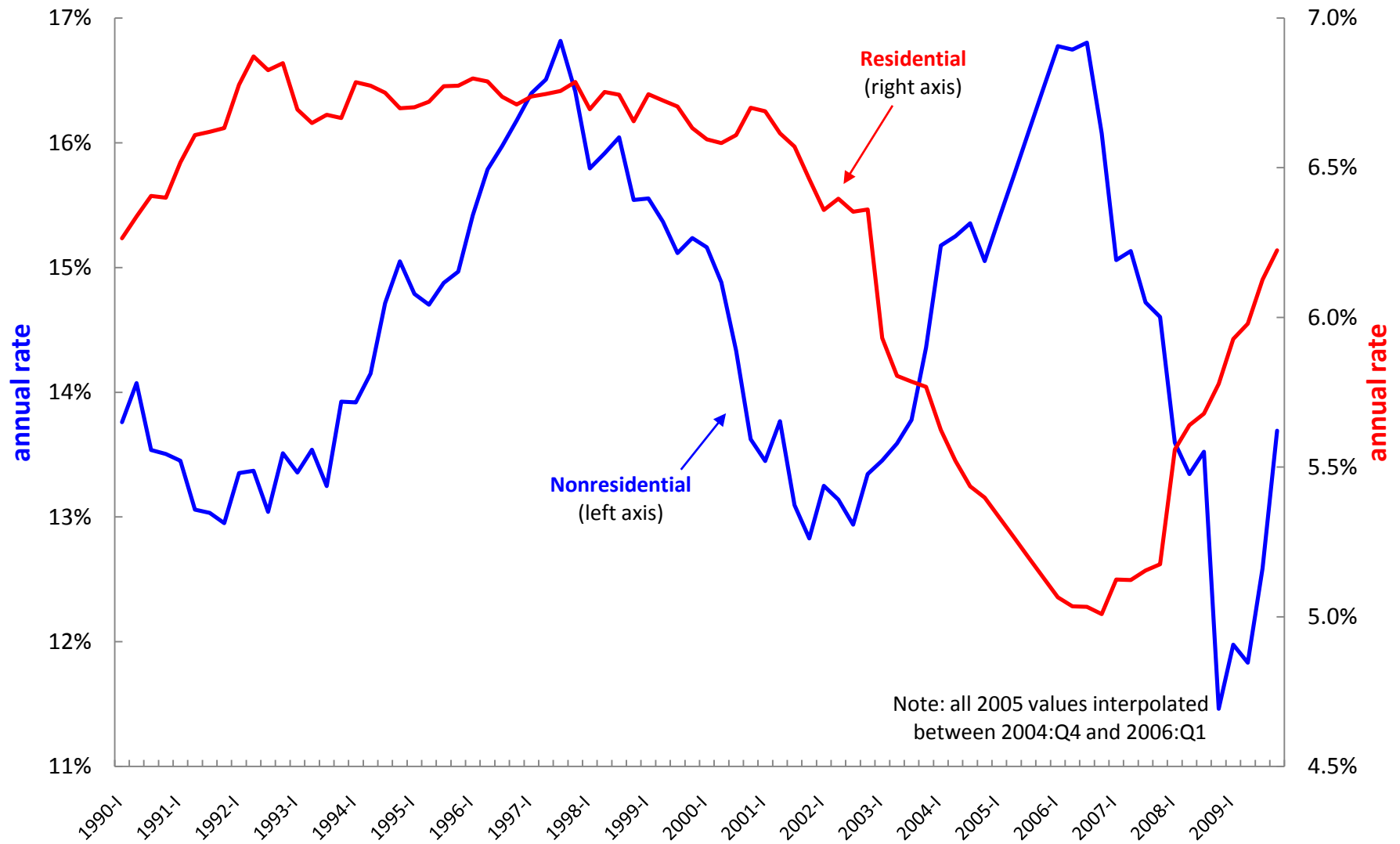
**Fig 3. The Sectoral Marginal Product of Capital Gap, 1930-2009**



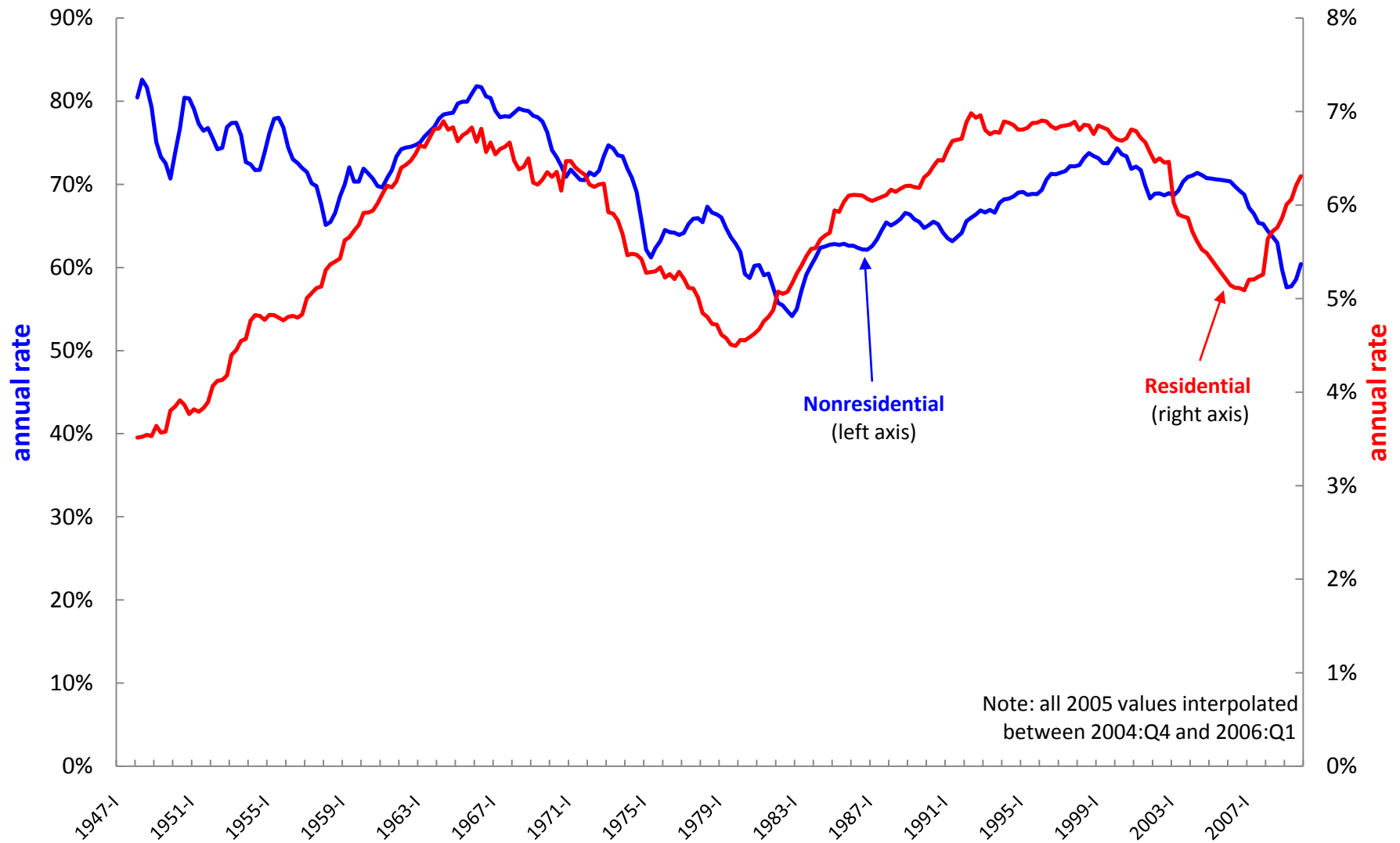
**Fig 4. The Marginal Product of Capital, 1948-I through 2009-IV**



**Fig 5. The Marginal Product of Capital, 1990-I through 2009-IV**



**Fig 6. The Average Product of Capital, 1947-I through 2009-IV**



**Table 1. Annual MPK and Stocks, by sector, 1930-2009**

Period	Residential		Nonresidential		Period	Residential		Nonresidential	
	MPK	Cap. Stock	MPK	Cap. Stock		MPK	Cap. Stock	MPK	Cap. Stock
1930	6.73%	\$119	14.4%	\$134	1971	6.32%	\$1,004	15.0%	\$1,089
1931	7.07%	\$114	10.8%	\$127	1972	6.13%	\$1,129	15.5%	\$1,199
1932	7.91%	\$93	7.6%	\$113	1973	5.74%	\$1,262	15.7%	\$1,305
1933	6.81%	\$84	7.0%	\$105	1974	5.11%	\$1,446	13.5%	\$1,471
1934	5.23%	\$92	9.7%	\$106	1975	4.99%	\$1,645	12.9%	\$1,792
1935	5.28%	\$92	12.0%	\$108	1976	5.09%	\$1,783	13.6%	\$1,974
1936	5.38%	\$94	14.6%	\$107	1977	5.01%	\$1,979	14.2%	\$2,161
1937	4.99%	\$104	13.8%	\$118	1978	4.65%	\$2,310	14.2%	\$2,402
1938	5.35%	\$111	12.1%	\$123	1979	4.35%	\$2,665	13.1%	\$2,727
1939	5.28%	\$113	13.8%	\$121	1980	4.28%	\$3,094	11.4%	\$3,147
1940	5.03%	\$116	16.5%	\$121	1981	4.47%	\$3,488	12.1%	\$3,614
1941	4.64%	\$128	20.7%	\$129	1982	4.86%	\$3,752	11.2%	\$4,088
1942	4.47%	\$139	21.9%	\$145	1983	5.18%	\$3,921	12.1%	\$4,348
1943	4.45%	\$150	24.7%	\$154	1984	5.47%	\$4,078	14.2%	\$4,480
1944	4.46%	\$163	25.0%	\$156	1985	5.84%	\$4,309	13.9%	\$4,747
1945	4.36%	\$174	22.2%	\$157	1986	6.05%	\$4,540	13.1%	\$5,013
1946	4.17%	\$184	18.4%	\$172	1987	5.93%	\$4,903	13.3%	\$5,251
1947	3.36%	\$227	17.5%	\$212	1988	6.00%	\$5,220	14.1%	\$5,534
1948	3.34%	\$267	19.0%	\$255	1989	6.02%	\$5,544	14.0%	\$5,888
1949	3.68%	\$287	17.3%	\$280	1990	6.18%	\$5,849	13.3%	\$6,241
1950	3.83%	\$302	19.9%	\$285	1991	6.43%	\$6,075	12.8%	\$6,571
1951	3.62%	\$339	18.8%	\$323	1992	6.72%	\$6,211	13.0%	\$6,702
1952	4.03%	\$368	17.5%	\$352	1993	6.69%	\$6,553	13.5%	\$6,910
1953	4.37%	\$386	16.9%	\$371	1994	6.78%	\$6,956	14.5%	\$7,222
1954	4.71%	\$400	16.3%	\$386	1995	6.72%	\$7,451	14.8%	\$7,603
1955	4.81%	\$422	19.3%	\$396	1996	6.74%	\$7,785	15.7%	\$8,000
1956	4.70%	\$455	17.1%	\$437	1997	6.76%	\$8,216	16.6%	\$8,382
1957	4.87%	\$477	15.4%	\$483	1998	6.79%	\$8,678	15.9%	\$8,838
1958	5.18%	\$493	13.8%	\$515	1999	6.78%	\$9,249	15.4%	\$9,342
1959	5.59%	\$507	16.0%	\$524	2000	6.65%	\$9,937	14.5%	\$9,892
1960	5.84%	\$529	15.4%	\$546	2001	6.65%	\$10,628	13.3%	\$10,573
1961	6.08%	\$550	15.8%	\$557	2002	6.38%	\$11,420	13.1%	\$11,125
1962	6.33%	\$570	17.4%	\$572	2003	5.89%	\$12,156	13.6%	\$11,552
1963	6.50%	\$591	18.0%	\$592	2004	5.61%	\$13,196	15.2%	\$11,943
1964	6.70%	\$606	19.0%	\$613	2005	5.27%	\$14,781	16.2%	\$12,922
1965	6.60%	\$655	20.3%	\$650	2006	5.05%	\$16,482	16.6%	\$14,071
1966	6.51%	\$695	20.0%	\$695	2007	5.07%	\$17,631	14.9%	\$15,189
1967	6.42%	\$752	18.4%	\$757	2008	5.53%	\$17,851	12.9%	\$16,024
1968	6.27%	\$803	18.0%	\$818	2009	5.93%	\$17,024	12.4%	\$17,182
1969	6.05%	\$887	16.6%	\$899					
1970	6.09%	\$949	14.4%	\$990					

Note: stocks in billions, at replacement cost, beginning of period

**Table 2. Quarterly MPK and Stocks, by sector, 1948-I through 2009-IV**

Period	Residential		Nonresidential		Period	Residential		Nonresidential	
	MPK	Cap. Stock	MPK	Cap. Stock		MPK	Cap. Stock	MPK	Cap. Stock
1948-I	3.41%	\$267	19.1%	\$254	1959-I	5.51%	\$507	15.8%	\$523
1948-II	3.41%	\$272	20.2%	\$257	1959-II	5.54%	\$513	17.0%	\$527
1948-III	3.43%	\$277	19.4%	\$265	1959-III	5.61%	\$519	15.7%	\$534
1948-IV	3.42%	\$284	19.3%	\$274	1959-IV	5.67%	\$524	15.7%	\$540
1949-I	3.54%	\$287	18.0%	\$279	1960-I	5.80%	\$529	16.4%	\$545
1949-II	3.47%	\$299	17.0%	\$279	1960-II	5.81%	\$535	15.5%	\$548
1949-III	3.48%	\$305	17.4%	\$282	1960-III	5.83%	\$541	15.4%	\$552
1949-IV	3.70%	\$294	15.9%	\$283	1960-IV	5.91%	\$545	14.9%	\$554
1950-I	3.72%	\$302	17.5%	\$284	1961-I	5.99%	\$550	14.7%	\$556
1950-II	3.78%	\$305	19.0%	\$287	1961-II	6.08%	\$553	15.6%	\$559
1950-III	3.74%	\$317	20.7%	\$294	1961-III	6.06%	\$560	16.1%	\$562
1950-IV	3.64%	\$335	21.1%	\$305	1961-IV	6.13%	\$566	17.0%	\$566
1951-I	3.70%	\$339	19.9%	\$322	1962-I	6.24%	\$570	17.2%	\$571
1951-II	3.68%	\$351	19.1%	\$333	1962-II	6.28%	\$576	17.1%	\$576
1951-III	3.72%	\$358	19.1%	\$340	1962-III	6.32%	\$582	17.3%	\$582
1951-IV	3.78%	\$362	19.4%	\$345	1962-IV	6.39%	\$587	17.7%	\$587
1952-I	3.96%	\$368	18.0%	\$351	1963-I	6.47%	\$591	17.5%	\$591
1952-II	4.01%	\$372	17.1%	\$358	1963-II	6.45%	\$596	18.1%	\$597
1952-III	4.02%	\$379	16.9%	\$363	1963-III	6.55%	\$598	18.3%	\$601
1952-IV	4.07%	\$385	18.1%	\$365	1963-IV	6.64%	\$598	18.4%	\$607
1953-I	4.27%	\$386	18.1%	\$370	1964-I	6.66%	\$606	19.1%	\$612
1953-II	4.33%	\$389	17.7%	\$372	1964-II	6.73%	\$606	19.0%	\$619
1953-III	4.42%	\$393	17.1%	\$378	1964-III	6.64%	\$624	19.0%	\$630
1953-IV	4.44%	\$399	14.7%	\$383	1964-IV	6.67%	\$633	18.8%	\$637
1954-I	4.64%	\$400	15.5%	\$385	1965-I	6.53%	\$655	20.0%	\$649
1954-II	4.70%	\$402	15.8%	\$389	1965-II	6.60%	\$660	20.1%	\$658
1954-III	4.69%	\$407	16.3%	\$392	1965-III	6.63%	\$666	20.1%	\$669
1954-IV	4.65%	\$417	17.5%	\$392	1965-IV	6.68%	\$671	20.4%	\$681
1955-I	4.71%	\$422	18.9%	\$395	1966-I	6.53%	\$695	20.7%	\$694
1955-II	4.71%	\$430	19.3%	\$397	1966-II	6.67%	\$690	20.2%	\$704
1955-III	4.68%	\$440	19.0%	\$405	1966-III	6.43%	\$726	19.5%	\$723
1955-IV	4.65%	\$449	18.7%	\$419	1966-IV	6.53%	\$727	19.4%	\$736
1956-I	4.68%	\$455	17.5%	\$435	1967-I	6.41%	\$752	18.7%	\$755
1956-II	4.69%	\$461	16.9%	\$450	1967-II	6.47%	\$759	18.3%	\$769
1956-III	4.67%	\$471	16.5%	\$457	1967-III	6.49%	\$768	18.3%	\$783
1956-IV	4.70%	\$475	16.2%	\$472	1967-IV	6.54%	\$779	18.4%	\$798
1957-I	4.88%	\$477	16.4%	\$481	1968-I	6.35%	\$803	18.2%	\$816
1957-II	4.93%	\$479	15.8%	\$492	1968-II	6.26%	\$824	18.5%	\$833
1957-III	4.99%	\$484	15.5%	\$499	1968-III	6.29%	\$838	18.1%	\$853
1957-IV	5.00%	\$491	14.4%	\$506	1968-IV	6.38%	\$845	17.9%	\$871
1958-I	5.19%	\$493	13.1%	\$514	1969-I	6.12%	\$887	17.8%	\$897
1958-II	5.25%	\$494	13.5%	\$511	1969-II	6.10%	\$906	17.2%	\$916
1958-III	5.28%	\$498	14.3%	\$516	1969-III	6.15%	\$923	16.6%	\$938
1958-IV	5.31%	\$502	15.6%	\$519	1969-IV	6.23%	\$932	15.6%	\$962



Period	Residential		Nonresidential		Period	Residential		Nonresidential	
	MPK	Cap. Stock	MPK	Cap. Stock		MPK	Cap. Stock	MPK	Cap. Stock
1970-I	6.19%	\$949	14.5%	\$988	1981-I	4.61%	\$3,488	12.5%	\$3,608
1970-II	6.24%	\$956	14.8%	\$1,011	1981-II	4.70%	\$3,571	12.3%	\$3,740
1970-III	6.04%	\$1,011	14.7%	\$1,042	1981-III	4.74%	\$3,635	13.2%	\$3,863
1970-IV	6.35%	\$984	14.2%	\$1,060	1981-IV	4.81%	\$3,690	12.4%	\$3,966
1971-I	6.37%	\$1,004	15.2%	\$1,087	1982-I	5.01%	\$3,752	11.5%	\$4,082
1971-II	6.30%	\$1,039	15.0%	\$1,119	1982-II	4.99%	\$3,806	11.9%	\$4,174
1971-III	6.25%	\$1,070	14.9%	\$1,149	1982-III	5.01%	\$3,861	11.5%	\$4,254
1971-IV	6.22%	\$1,101	15.0%	\$1,175	1982-IV	5.10%	\$3,896	11.1%	\$4,307
1972-I	6.12%	\$1,129	15.3%	\$1,197	1983-I	5.20%	\$3,921	11.6%	\$4,341
1972-II	6.10%	\$1,158	14.9%	\$1,228	1983-II	5.29%	\$3,955	12.5%	\$4,288
1972-III	6.13%	\$1,176	15.6%	\$1,254	1983-III	5.39%	\$3,984	13.3%	\$4,272
1972-IV	6.13%	\$1,209	16.2%	\$1,279	1983-IV	5.46%	\$4,023	13.6%	\$4,335
1973-I	5.84%	\$1,262	16.5%	\$1,303	1984-I	5.47%	\$4,078	14.1%	\$4,474
1973-II	5.82%	\$1,295	15.9%	\$1,336	1984-II	5.56%	\$4,128	14.6%	\$4,525
1973-III	5.75%	\$1,343	15.6%	\$1,381	1984-III	5.60%	\$4,186	14.6%	\$4,605
1973-IV	5.61%	\$1,406	15.6%	\$1,429	1984-IV	5.63%	\$4,251	14.7%	\$4,672
1974-I	5.39%	\$1,446	14.9%	\$1,469	1985-I	5.87%	\$4,309	14.4%	\$4,742
1974-II	5.41%	\$1,489	14.5%	\$1,516	1985-II	5.85%	\$4,359	14.1%	\$4,804
1974-III	5.40%	\$1,533	13.8%	\$1,588	1985-III	5.96%	\$4,397	14.2%	\$4,862
1974-IV	5.35%	\$1,593	13.0%	\$1,683	1985-IV	6.03%	\$4,457	13.7%	\$4,930
1975-I	5.21%	\$1,645	12.6%	\$1,788	1986-I	6.03%	\$4,540	13.7%	\$5,007
1975-II	5.21%	\$1,689	12.9%	\$1,856	1986-II	6.03%	\$4,629	13.4%	\$5,051
1975-III	5.22%	\$1,723	13.9%	\$1,906	1986-III	6.03%	\$4,710	13.0%	\$5,119
1975-IV	5.26%	\$1,746	14.0%	\$1,937	1986-IV	5.99%	\$4,808	12.7%	\$5,187
1976-I	5.16%	\$1,783	14.5%	\$1,970	1987-I	5.97%	\$4,903	12.8%	\$5,245
1976-II	5.19%	\$1,807	14.0%	\$2,012	1987-II	5.99%	\$4,988	13.4%	\$5,301
1976-III	5.14%	\$1,879	13.8%	\$2,057	1987-III	6.01%	\$5,061	14.1%	\$5,345
1976-IV	5.21%	\$1,926	13.4%	\$2,104	1987-IV	6.03%	\$5,139	14.2%	\$5,393
1977-I	5.14%	\$1,979	13.6%	\$2,157	1988-I	6.09%	\$5,220	14.1%	\$5,528
1977-II	5.05%	\$2,046	14.6%	\$2,221	1988-II	6.07%	\$5,302	14.0%	\$5,628
1977-III	5.04%	\$2,125	15.1%	\$2,275	1988-III	6.10%	\$5,386	14.2%	\$5,702
1977-IV	4.95%	\$2,219	14.7%	\$2,336	1988-IV	6.13%	\$5,456	14.9%	\$5,772
1978-I	4.78%	\$2,310	14.1%	\$2,398	1989-I	6.13%	\$5,544	14.7%	\$5,882
1978-II	4.74%	\$2,397	15.0%	\$2,469	1989-II	6.12%	\$5,620	14.5%	\$5,966
1978-III	4.67%	\$2,489	14.6%	\$2,551	1989-III	6.11%	\$5,724	14.4%	\$6,049
1978-IV	4.66%	\$2,575	14.6%	\$2,635	1989-IV	6.22%	\$5,779	13.7%	\$6,140
1979-I	4.55%	\$2,665	14.1%	\$2,724	1990-I	6.26%	\$5,849	13.8%	\$6,234
1979-II	4.51%	\$2,745	13.7%	\$2,826	1990-II	6.34%	\$5,927	14.1%	\$6,309
1979-III	4.44%	\$2,869	13.3%	\$2,933	1990-III	6.41%	\$5,981	13.5%	\$6,372
1979-IV	4.43%	\$2,992	13.1%	\$3,041	1990-IV	6.40%	\$6,038	13.5%	\$6,465
1980-I	4.50%	\$3,094	12.9%	\$3,143	1991-I	6.52%	\$6,075	13.4%	\$6,564
1980-II	4.49%	\$3,197	11.4%	\$3,257	1991-II	6.61%	\$6,110	13.1%	\$6,663
1980-III	4.53%	\$3,290	11.3%	\$3,375	1991-III	6.62%	\$6,153	13.0%	\$6,681
1980-IV	4.56%	\$3,384	12.5%	\$3,491	1991-IV	6.63%	\$6,207	12.9%	\$6,690

Period	Residential		Nonresidential		Period	Residential		Nonresidential	
	MPK	Cap. Stock	MPK	Cap. Stock		MPK	Cap. Stock	MPK	Cap. Stock
1992-I	6.78%	\$6,211	13.4%	\$6,694	2003-I	5.93%	\$12,156	13.5%	\$11,540
1992-II	6.87%	\$6,221	13.4%	\$6,754	2003-II	5.80%	\$12,540	13.6%	\$11,610
1992-III	6.83%	\$6,326	13.0%	\$6,769	2003-III	5.79%	\$12,646	13.8%	\$11,627
1992-IV	6.85%	\$6,415	13.5%	\$6,848	2003-IV	5.77%	\$12,836	14.4%	\$11,745
1993-I	6.69%	\$6,553	13.4%	\$6,902	2004-I	5.62%	\$13,196	15.2%	\$11,930
1993-II	6.65%	\$6,671	13.5%	\$7,006	2004-II	5.52%	\$13,619	15.2%	\$12,110
1993-III	6.68%	\$6,775	13.2%	\$7,077	2004-III	5.44%	\$14,027	15.4%	\$12,394
1993-IV	6.67%	\$6,881	13.9%	\$7,140	2004-IV	5.40%	\$14,439	15.1%	\$12,638
1994-I	6.79%	\$6,956	13.9%	\$7,214	2005-I	5.33%	\$14,781	15.4%	\$12,906
1994-II	6.77%	\$7,086	14.1%	\$7,336	2005-II	5.27%	\$15,098	15.7%	\$13,222
1994-III	6.75%	\$7,175	14.7%	\$7,446	2005-III	5.20%	\$15,485	16.1%	\$13,481
1994-IV	6.70%	\$7,304	15.0%	\$7,541	2005-IV	5.13%	\$16,039	16.4%	\$13,718
1995-I	6.70%	\$7,451	14.8%	\$7,595	2006-I	5.07%	\$16,482	16.8%	\$14,057
1995-II	6.72%	\$7,571	14.7%	\$7,698	2006-II	5.03%	\$16,896	16.7%	\$14,333
1995-III	6.77%	\$7,640	14.9%	\$7,826	2006-III	5.03%	\$17,191	16.8%	\$14,605
1995-IV	6.77%	\$7,707	15.0%	\$7,922	2006-IV	5.01%	\$17,369	16.1%	\$14,867
1996-I	6.80%	\$7,785	15.4%	\$7,990	2007-I	5.12%	\$17,631	15.1%	\$15,174
1996-II	6.79%	\$7,870	15.8%	\$8,030	2007-II	5.12%	\$17,752	15.1%	\$15,459
1996-III	6.74%	\$7,965	16.0%	\$8,071	2007-III	5.15%	\$17,778	14.7%	\$15,670
1996-IV	6.71%	\$8,117	16.2%	\$8,247	2007-IV	5.18%	\$17,835	14.6%	\$15,818
1997-I	6.74%	\$8,216	16.4%	\$8,372	2008-I	5.56%	\$17,903	13.6%	\$15,999
1997-II	6.75%	\$8,317	16.5%	\$8,473	2008-II	5.64%	\$17,890	13.3%	\$16,141
1997-III	6.76%	\$8,416	16.8%	\$8,591	2008-III	5.68%	\$17,891	13.5%	\$16,360
1997-IV	6.79%	\$8,551	16.4%	\$8,732	2008-IV	5.78%	\$17,815	11.5%	\$16,693
1998-I	6.70%	\$8,678	15.8%	\$8,828	2009-I	5.93%	\$17,626	12.0%	\$17,014
1998-II	6.75%	\$8,772	15.9%	\$8,871	2009-II	5.98%	\$17,472	11.8%	\$16,919
1998-III	6.74%	\$8,908	16.0%	\$8,981	2009-III	6.13%	\$17,120	12.6%	\$16,730
1998-IV	6.66%	\$9,080	15.5%	\$9,146	2009-IV	6.22%	\$16,942	13.7%	\$16,562
1999-I	6.75%	\$9,249	15.6%	\$9,333					
1999-II	6.72%	\$9,422	15.4%	\$9,490					
1999-III	6.70%	\$9,609	15.1%	\$9,603					
1999-IV	6.63%	\$9,775	15.2%	\$9,705					
2000-I	6.59%	\$9,937	15.2%	\$9,883					
2000-II	6.58%	\$10,168	14.9%	\$10,057					
2000-III	6.61%	\$10,330	14.3%	\$10,221					
2000-IV	6.70%	\$10,476	13.6%	\$10,419					
2001-I	6.69%	\$10,628	13.4%	\$10,562					
2001-II	6.61%	\$10,832	13.8%	\$10,625					
2001-III	6.57%	\$11,027	13.1%	\$10,830					
2001-IV	6.46%	\$11,274	12.8%	\$11,012					
2002-I	6.36%	\$11,420	13.3%	\$11,113					
2002-II	6.40%	\$11,486	13.1%	\$11,221					
2002-III	6.35%	\$11,659	12.9%	\$11,274					
2002-IV	6.36%	\$11,812	13.3%	\$11,342					

Note: see Notes to Table 1

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