The recent rise of corporate economic rents in New Zealand: historical and methodological perspectives

Geoff Bertram geoffbertram1@gmail.com
School of History, Philosophy, Political Science and International Relations
Victoria University of Wellington

Bill Rosenberg wj.rosenberg@gmail.com
School of History, Philosophy, Political Science and International Relations
Victoria University of Wellington

Abstract

The New Zealand National Accounts show a steeply rising income share for "gross operating surplus and mixed income" (GOSM) since the 1980s, potentially reflecting economic rents - profits over and above the true cost of capital under competitive conditions. This paper disaggregates the national-accounts total capital formation and gross surplus for 75 years 1949-2024, to obtain separate time series for four economic sectors: non-market enterprises, owner-occupied property, self-employed, and (as the residual) market-corporate enterprise. It then applies a model from Barkai (2020) to calculate a "warranted" or "required" return on fixed capital for the market-corporate sector and subtracts this from that sector's gross surplus to obtain an estimate of its economic rent. The result shows rent rising in the past three decades to reach over NZ$30 billion (10% of GDI) by 2024, concentrated in finance, business services, and trade. We argue that the explanation for this rising rent share lies in the exploitation of market power.

JEL subject codes: D33; E25; C82

Keywords: factor distribution; economic rent; cost of capital; national accounts

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1. Introduction

Numerous studies of income distribution in advanced economies, using their national income accounts, have identified a fall in the labour share and a rise in the share of "gross surplus and mixed income" since the early 1980s (Barkai 2016, 2020; Basu 2019; Baldi and Pons 2019; Eggertsson et al 2018; Hall 2018; De Loecker et al 2020; Karabarbounis and Neiman 2014; Kerspien and Madsen 2024).

For some authors the crucial change has been in the labour market, with the falling wage share attributed to reduced bargaining power of workers vis-à-vis employers (Stansbury and Summers 2020; Taylor and Omer 2020); there is evidence for this in New Zealand (Bertram and Rosenberg 2024). For others the key issue has been the rise of a rentier class within modern capitalism (Christophers 2020; Epstein and Power 2003; Varoufakis 2023; Mazzucato and Collington 2023) securing "unearned income" from an increase in firms' product prices relative to costs in an environment of loosened regulatory restraint (Philippon 2019). A third strand in the literature argues that the apparent rise in rents is explained by the entry into production of unobserved factors of production – "intangibles" - on which an earned surplus accrues under the standard neoclassical assumption of payment based on marginal product (O'Mahony et al 2021; Crouzet and Eberly 2023; Crouzet, Eberly, Eisfeldt and Papanikolaou 2022). A fourth strand suggests that the apparent rise in "factorless income" may be a result of mis-specification of the underlying model commonly used to estimate the rental cost of capital (Karabarbounis and Neiman 2019).

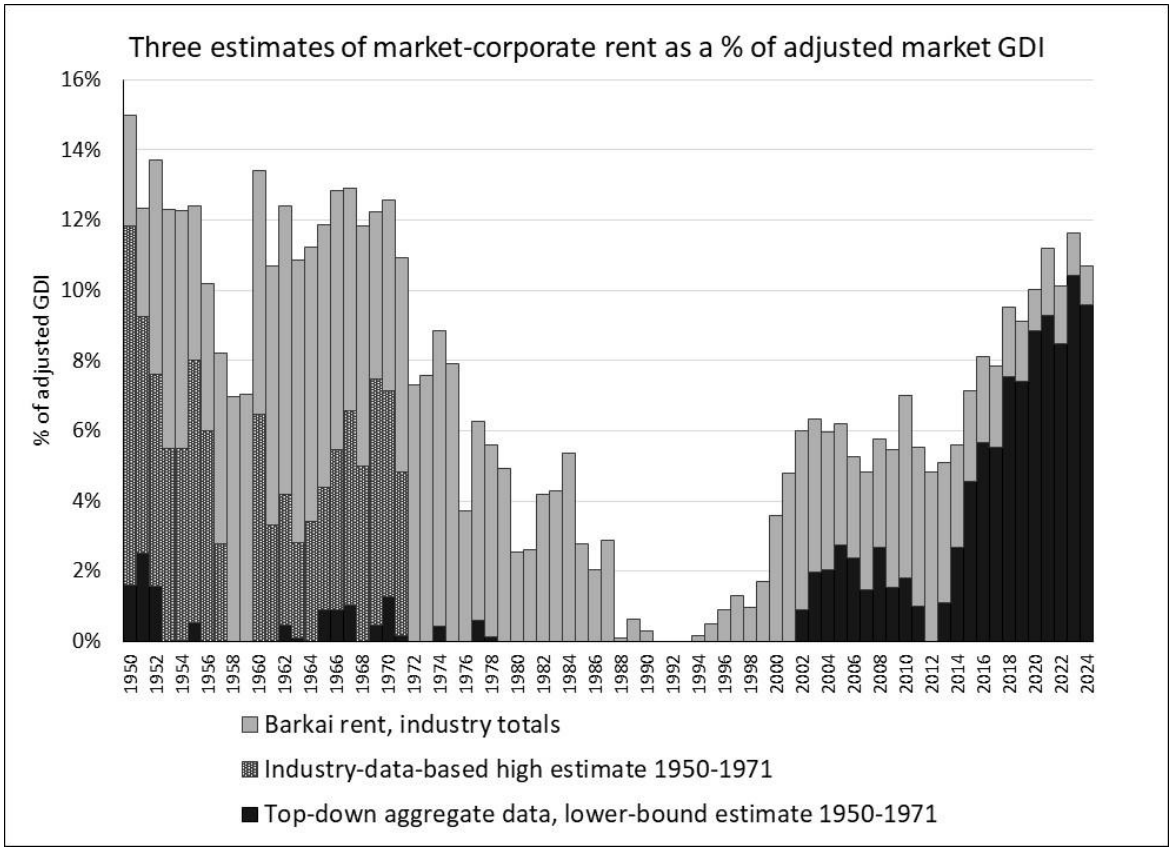
Our aim in this paper is to estimate how much of the appropriation of economic surplus by asset owners in the corporate market sector of the New Zealand economy represents a competitive cost of capital applied to their investment in productive fixed assets, and how much is economic rent (unearned income over and above the cost of capital, secured simply by ownership of the relevant assets). We adopt a standard definition of economic rent as any payment to the owner of a factor of production in excess of the costs needed to bring that factor into production (Robinson 1933 Chapter 8). We use a model developed by Barkai (2020), with data from the New Zealand national accounts, to look for a rent component in the operating surplus of corporate firms in the market sectors of the New Zealand economy since 1950.

This paper is therefore of international interest. It uses techniques which are applicable internationally to show the historical and industrial pattern of economic rents in a small, open advanced economy. It can be compared with analyses of the US economy by Barkai and shows some similar patterns.

The Barkai procedure, based on Hall and Jorgenson (1967), is to calculate a competitive required return on each year's historic investment in fixed assets, on the assumption that the cost of capital in that year (calculated from the prevailing interest rate, tax rate, asset-specific

depreciation rates, and expected capital gains from asset-price inflation) corresponds to the required level of expected return to incentivise the actual aggregate investment. Subtracting this "required" annual return on successive vintages of capital formation from the realised gross surplus in each period produces an estimate of excess pure profit, which we shall refer to as "Barkai rent".

Figure 1



Source: Table 8 in Statistical Appendix

Figure 1 summarises the results of three separate calculations.

- When top-down aggregate data for the economy as a whole are used (the black columns), Barkai rent has risen strongly since the Global Financial Crisis, reaching 9-10% of adjusted market GDI[1] (around $30 billion[2] per year) in the early 2020s, in strong contrast to earlier years between 1950 and 2000, when total rent calculated in this way never exceeds 2.5%. This is the lowest of our three estimates for two reasons. In the first place, aggregate economy-wide data combines industries that display negative rather than positive excess returns with industries where excess returns are large, bringing the total result down. In the second place, for years prior to 1972 when the modern System of National Accounts data become available, aggregate series derived from the earlier official national accounts statistics do not reconcile well with

1 "Adjusted Gross Domestic Income" is our term for total factor payments in market sectors, but excluding the imputed rent on owner-occupied property.

2 All dollar numbers in this paper are references to New Zealand dollars.

the unofficial industry-level data used for the other two calculations, resulting in low rent estimates.

- The second calculation, shown with intermediate shading, covers the years 1950-1971 and has been constructed by adding up detailed industry-by-industry data, which results in a series for total gross surplus that is larger than the national-accounts-derived aggregate series. In this calculation, industries with negative excess returns are again aggregated with positive-rent industries, resulting in an aggregate rent estimate for the 1950s and 1960s of 5-6% of adjusted market GDI.
- The third measure, obtained by adding up those industries in which rents were positive, but setting aside industries with zero or negative rent, produces the larger numbers shown by the light columns: rents generally over 10% of adjusted GDI until the early 1970s, dropping steeply thereafter until 1993 before rebounding to 5%-6% in the 2000s and then rising to 10-11% ($30-34 billion per year) in the early 2020s.

On all three measures, Barkai rents have increased sharply since deregulation of the New Zealand economy in the 1980s and 1990s, and especially since the Global Financial Crisis of 2007-2009. The basis for this recent increase in rents, we shall argue, appears to have been the exercise of market power to increase margins. Alternative explanations such as unobserved intangibles or model mis-specification are considered but rejected.

Historically, Barkai rents in the 1950s and 1960s were heavily concentrated in manufacturing and trade (wholesale and retail including accommodation and food services) – the two industries most advantaged by that era's strong performance of pastoral exports with associated industrial processing, combined with import controls which protected import substituting industry and raised importers' margins (Easton 1997 Chapter 7, McAloon 2013 Chapter 4; Reserve Bank of New Zealand 1981; Bertram 2007 pp.542-544). In contrast, the steep rise in rents since 2000 is dominated by finance and business services, along with trade. Details are in section 5 below.

It should be noted at the outset that Barkai rent does not capture the full scope of rents in the economy under the definition above. It does not include any rent component of high wages and salaries, nor the imputed rent attributable to owner-occupied premises, nor any unearned incomes in the form of unanticipated capital gains, nor (in our calculations, for reasons explained below) any rent component of the "mixed income" of the self-employed, who have historically played a major role in the New Zealand economy. The results reported in this paper relate only to identifiable rent appropriation in New Zealand by corporate businesses in the market sectors of the economy.

2. The Barkai model

This section sets out the model, based on Hall and Jorgenson (1967), that was developed by Barkai (2020) to estimate the competitive "required" return on capital invested in the US economy. The procedure multiplies the cost of each item of historical fixed capital formation by its corresponding asset-specific cost of capital at the time the investment was undertaken, to estimate a required annual dollar sum sufficient to have incentivised the original

investment. Pure profit is then calculated as gross operating surplus minus the required return.

Barkai's general formula for the required or warranted capital share of gross total value added was taken from Hall and Jorgenson (1967) and is (Barkai 2020 p.2426 equation 5):

$$S^K = \frac{\sum_s R_s P_s^K K_s}{P^Y Y}$$

where

S^K is the warranted cost-of-capital share of gross nominal value added

R_s is the warranted rate of return on capital of type *s*, comprising the weighted average cost of capital, plus the depreciation rate, minus expected price inflation (capital gain) of capital goods of type *s*, all adjusted for depreciation-related corporate tax deductions.

K_s is the net stock of capital goods of type *s.*

P_s^K is the price of capital goods of type *s* at the time of their installation (whence $P_s^K K_s$ is historic cost).

$P^Y Y$ is the adjusted nominal value of gross value added at factor cost (GDI excluding the imputed return on owner-occupied housing).

Pure profit or rent is (Barkai 2020 p.2426 equation (6))[3]

$$\Pi = P^Y Y - wL - RP^K K$$

The economy is treated as a single firm which invests in three types of fixed capital[4] with the expectation of recovering, over the life of the investment, at least sufficient revenue to cover operating costs (wages and intermediate purchases) plus the cost of capital at the economy-wide rate. The crucial cost of capital, $RP^K K$, is the product of the historic-cost value of net capital stock and the required rate of return *R*, which in turn is calculated as (Barkai 2020 p.2425 equation 2)

$$R = \left[\left(\frac{D}{D+E} i^D (1-\tau) + \frac{E}{D+E} i^E\right) - \mathbb{E}[\pi] + \delta\right] \frac{1-z\tau}{1-\tau} \qquad (1)$$

where

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[3] Barkai's equation 6 includes a term for indirect taxes, which is not required here because all the national-accounts magnitudes in our tables are already at factor cost.

[4] Barkai (2020) divides his capital stock into non-residential structures, equipment, and Intellectual Property Products (IPPs). The sectoral breakdown of the New Zealand national accounts has enabled us to exclude owner-occupied property but not other residential structures. We work with 'buildings construction and land improvement', 'plant and equipment', and 'intangibles'.

$\frac{D}{D+E}$ is the leverage ratio (debt to total debt plus equity)

i^D is the debt cost of capital

i^E is the equity cost of capital

τ is the corporate tax rate

$\mathbb{E}[\pi]$ is the expected inflation rate of capital goods, which Barkai sets equal to the actual rate in each year[5]

δ is the depreciation rate

z is the net present value of depreciation tax allowances[6]

The aggregate firm's required or warranted gross rate of return thus comprises the post-tax Weighted Average Cost of Capital $\left(\frac{D}{D+E}i^D(1-\tau)+\frac{E}{D+E}i^E\right)$ plus the depreciation rate for each type of capital, minus expected capital gains on net capital held, all marked up for the present value of depreciation tax allowances. Multiplying this ratio by net capital stock for each vintage of past investment and aggregating across capital asset types gives the economy-wide cost of capital on all past investment in fixed assets. Subtracting this from actual operating surplus in the current year provides the estimate of pure profit (Barkai rent).

Because New Zealand does not tax capital gains, we modify Barkai's equation by taking capital gains outside the square brackets in equation (1). Then aggregating over successive vintages of Gross Fixed Capital Formation (GFCF) in various types of capital assets from 1949 on, and allowing for year-specific WACC and expected capital gains, the total warranted-return claim on the surplus in year t is given by

$$W_t = \sum_s \sum_{y=1949}^{t-1} \left\{\left[\left(WACC_y \frac{(1-z_y^s\tau_y)}{(1-\tau_y)} - E\left[\varphi_y^s\right]\right)\right] P_{sy}^K K_y^s + \delta_y^s \frac{(1-z_y^s\tau_y)}{(1-\tau_y)} I_y^s\right\} \frac{P_t}{P_y} \qquad (2)$$

where

W_t is the total warranted return on the historic-cost net capital stock at the beginning of year t, deflated to real dollars using the consumer price index P

K_y^s is the depreciated net stock in year t of capital assets of type s installed in year y

P_{sy}^K is the price of capital assets of type s in year in year y

$P_{sy}^K K_y^s$ is therefore the historic-cost depreciated value in year t of the accumulated stock of fixed assets of type s installed in each of the investment years *y=1949, 1950…t-1*

$WACC_y$ is the weighted average cost of capital in investment year y

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5 We have instead used the three-year average capital-goods inflation rate to form expectations.

6 We use the WACC for the relevant year as the discount rate.

$E\left[\varphi_y^s\right]$ is the expected rate of inflation for capital goods of type *s* in year *y* which is here set equal to the three-year rolling average in year in year *y* of capital-goods price inflation for the relevant asset class

δ_y^s is the depreciation rate for assets of type *s* installed in year *y*

I_y^s is the dollar amount of investment in assets of type *s* in year *y*

P_t and P_y are the consumer price index in years *t* and *y* respectively

All other variables as defined previously.

An important element in the specification of this model is that each item of capital equipment carries its initial cost of capital throughout its operating life, without regard to two potential changes that may eventuate in subsequent years. First, if interest rates fall substantially, the option of refinancing any loans raised at the time of the investment will provide a windfall gain for asset owners that is not accounted for in the model[7]. Second, not all investments will prove successful, and in those cases fixed capital may be scrapped or sold off below its historic cost, which will mean that the model's accumulated net capital stock *K* includes the burden of assets that have disappeared before being fully depreciated, with the corresponding capital costs spread across the surviving businesses as a squeeze on their modelled profitability. We return to these issues in the conclusion.

3. A step-change in New Zealand's factor income distribution

To isolate data on the corporate market sectors of the economy it is necessary to make four adjustments to the published national-accounts aggregates. First, non-market sectors have to be excluded. Second, the gross imputed rent on owner-occupied property is set aside. Third, the wages and salaries paid to themselves by corporate working proprietors ("corporate mixed income" in the New Zealand national accounting terminology) are taken out, along with, fourth, the mixed income (returns to capital and labour plus any rents) of non-corporate self-employed small businesses[8]. Table 1 in the statistical appendix lays out the calculation with notes to explain the data sources used.

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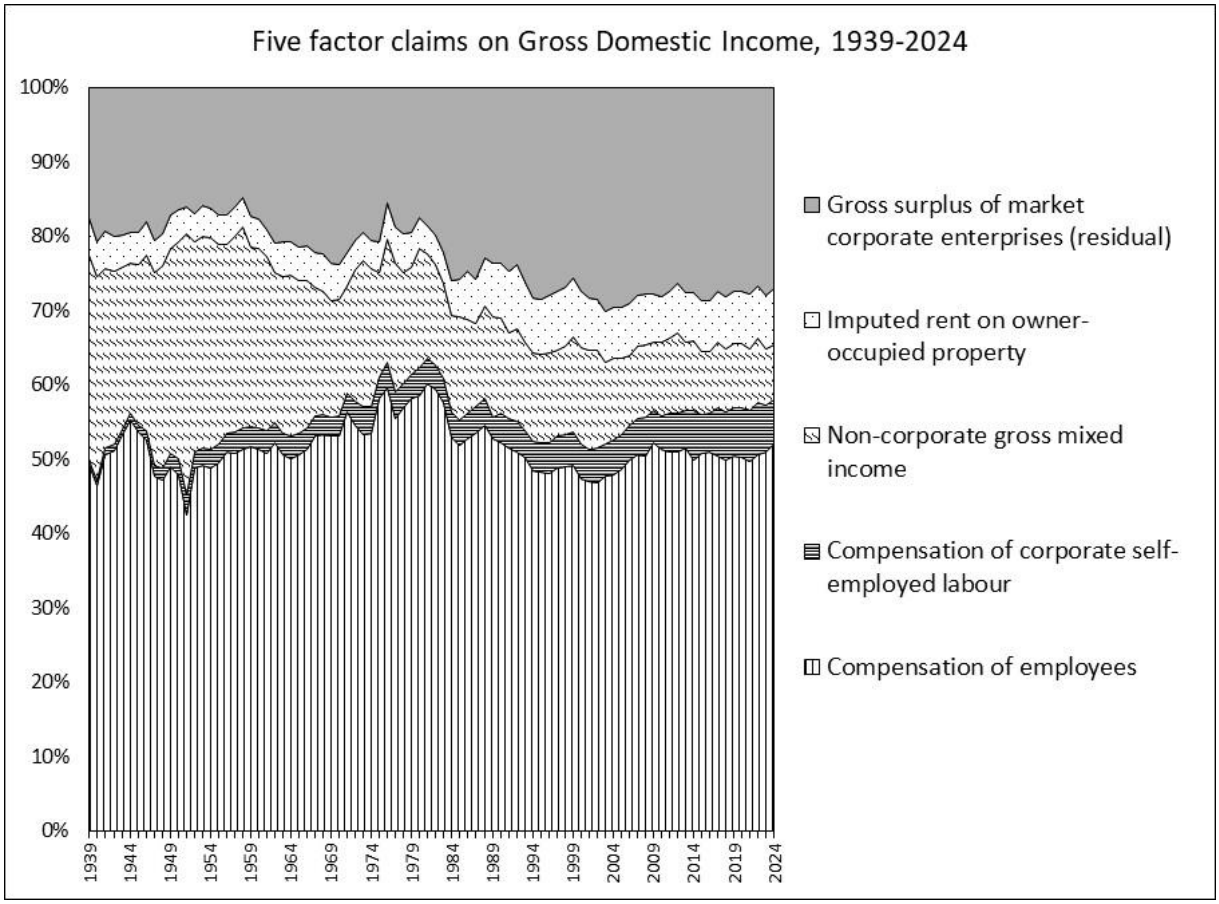
[7] For simplicity, and in the absence of information, we assume that all loan-funding of GFCF is for the full asset life, which equally means that there is no need to refinance in later years if interest rates rise.

[8] Statistics New Zealand (2024) p.26 defines "corporate mixed income" as "compensation of working proprietors within businesses with corporate structures: Compensation of employees payable used as the indicator". In other words, the official GMI of the corporate self-employed is treated as labour income, with an implicitly minimal profit component, even though Statistics New Zealand regards it as "more in the nature of profit withdrawals than payments to paid employees in return for their labour." Thus subtracting corporate mixed income from the GOSM series will bias our rent estimates down if anything. In correspondence with the authors, Statistics New Zealand has confirmed that "For corporate institutional units (mostly non-financial corps but includes financial corps), the mixed income is the income paid to working proprietors by their firms in salary-like payments"; and (emphasis added) that "Entrepreneurial income consists of the operating surplus, plus property income receivable, less property income payable, of unincorporated businesses (ie businesses owned and operated by individuals or partnerships). We also include the salaries and wages of working proprietors of private companies – which

Figure 2 shows the primary distribution of market-sectors Gross Domestic Income over the six decades 1950-2022 across the five market-sector claims.

The decade of neoliberal restructuring 1984-1994 displays a sharp one-off downward shift in the share of broadly-defined labour (wage and salary earners plus the mixed income of the self-employed), from three-quarters or more of market GDI on average 1950-1980 to just 60% 1993-2023[9]. Imputed rent on owner-occupied property (reflective of a general upward trend of rent on property) rose from 4% in the 1950s to 8-10% after 1992[10], while the gross surplus of corporate enterprise rose from 16% to 35%.

Figure 2



Source: Table 1 in the statistical appendix

While the non-market sectors have accounted for only around 5% of total surplus and mixed income, they account for a much larger share (between 15% and 20%) of the economy's total GFCF, due mainly to capital formation by Government.

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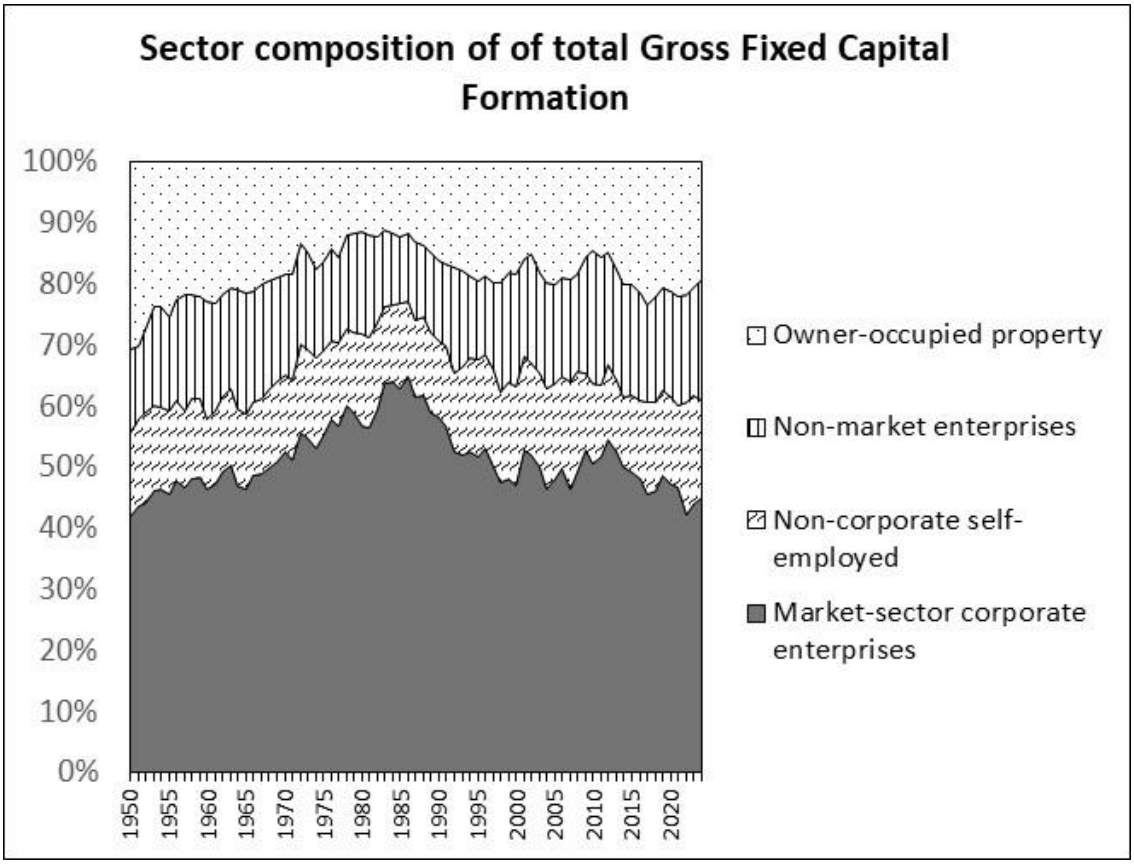
we treat as operating surplus in the New Zealand national accounts because they are more in the nature of profit withdrawals than payments to paid employees in return for their labour." For 1999-2023, the numbers are in series SNEA.S2NB0300S111C9 in SNZ's online Infoshare table SNE195AA. For 1987-1996 the equivalent can be calculated from Statistics New Zealand (1996, 1997, 1999).

9 We have analysed this squeeze on the labour share in detail in Bertram and Rosenberg (2024).

10 The self-employed share is analysed in detail in Bertram and Rosenberg (2025).

Figure 3 shows the breakdown of GFCF by sector, showing that market corporate enterprise has accounted for half or less of total capital formation, except for a brief peak in the 1980s. A turning point in the 1980s is apparent, with a falling market-corporate share of GFCF occurring alongside the fall in the labour share shown in Figure 1.

Figure 3



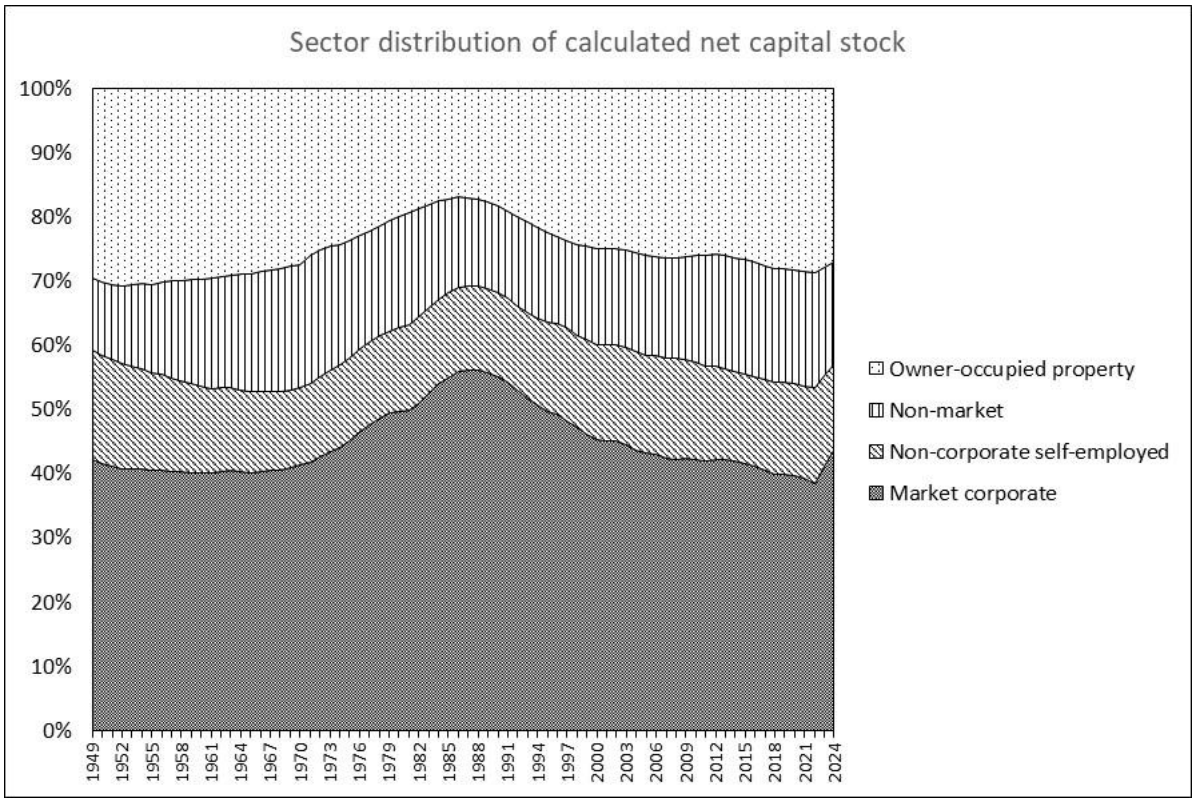
Source: Table 2 in Statistical Appendix

Figure 4 shows our estimates of the resulting distribution of historic-cost net capital stock across the four sector groups. Owner-occupied property and non-market sectors account for a dramatically increasing share of the total since about 1980, while market sectors have fallen away. This trend reflects first, the widely-observed dominance of real estate in investment spending and portfolios since the 1980s; and second, the depreciation assumptions used in our historic-cost calculations (2% for buildings, 10% for plant and equipment, and 25% for intangibles), which mean that the switch of investment out of productive assets into real estate (including hospitals and schools in the non-market category) is accentuated by the fact that real estate is much longer-lived than the other two asset classes.

The other feature of Figures 3 and 4 is the steep increase in market-corporate GFCF and capital stock in the 1970s and early 1980s, partly attributable to a government-led "Think Big" investment programme (Boshier 2022), and partly to a drive to diversify the economy in the wake of a collapse in the price of wool (at that time a major export) in 1968, Britain's entry to the European Economic Community (which resulted in loss of markets for New Zealand

exports), and the 1969 National Development Conference, convened in order to respond to these events (Gould 1985; Easton 1997 chapter 11, 2020 chapter 43).

Figure 4



Results from running the model in equation (2)

The official series for aggregate market-corporate initial capital stock, annual GFCF by asset, and annual surplus provide the inputs for a first estimate of corporate rents from a "top-down" point of view. An alternative "bottom-up" picture is then constructed by assembling, from a different source, the corresponding series disaggregated across eleven industries.

4. Issues with the national accounts data

In the textbook story, Gross Domestic Product is distributed in the form of three factor income flows (wages, profits, and rent) to three claimants – labour, capital, and "land" (shorthand for the stock of all non-produced assets, ownership of which confers the ability to lay claim to a share in the total product). The New Zealand national accounts do not exactly match this analytical scheme, for two reasons:

- The national accounts make no distinction between profits and rent, bundling them together under the heading "gross operating surplus", and then further bundling them with the income of the self-employed which is called "mixed income" because it includes indistinguishable payments for self-employed labour.
- The national-accounts item "compensation of employees" includes only the wages and salaries earned by people in an employment relationship with some employer. It does not include the labour income of the self-employed, which, as noted above, is included in "mixed income" and so is bundled together with operating surplus.

For the purpose of calculating Barkai-rent in the market-corporate sector we have undertaken the decomposition, by sectors and industries, of the national-accounts aggregates Gross Fixed Capital Formation (GFCF) and Gross Operating Surplus and Mixed Income (GOSM). This involves separating out three other components from aggregate GFCF and GOSM in order to leave the market-corporate numbers as residuals:

- First the imputed rent on, and capital formation in, owner-occupied property, is set aside, since the rent is a non-cash flow of income that does not arise directly as a market claim on actually produced goods and services (although in common with another sort of rent that lies outside the national accounts - capital gains - it confers an ability to borrow and spend against the relevant assets).
- Second, the capital formation and surplus of non-market sectors is removed, in order to focus just on profit-oriented enterprises.
- Third, the Gross Mixed Income (GMI) and GFCF of the self-employed has to be separated out.
    - For the "non-corporate" self-employed, this is straightforward for recent decades. Statistics New Zealand has published data on aggregate non-corporate GMI for years since 1987[11], and we have projected these back to 1950[12]. Unpublished industry-level data on non-corporate self-employed GMI and GFCF by industry back to 1977 have been provided on request, and again we have projected these back to 1950.
    - Turning to the corporate self-employed (working proprietors), Statistics New Zealand treats their reported "salary-like" payments to themselves as their GMI, with all other surplus included in the market sector's aggregate gross surplus. Consistent with this, working proprietors' GFCF is not recorded separately from other corporate GFCF. Thus corporate self-employed GFCF and declared surplus are included in our market-corporate data, but all reported returns to the labour of the corporate self-employed are excluded[13].

The detail of these analytical steps is set out in the Statistical Appendix. Aggregate economy-wide numbers for GOSM and GFCF are disaggregated across eleven industries, using the ANZSIC2006 and NZSIOC Level-1 classifications as far back as possible, and approximations to them for earlier years[14], and with GFCF broken down across three asset types. For the years before 1972 when the current national accounts begin, data comes from Department of

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11 For the years 1999-2023, series SNEA.S2NB0300S121C0 (GMI noncorporate business enterprises) in Infoshare table SNE 196AA and series SNEA.S2NB0300S200C0 (GMI financial business enterprises) in Infoshare table SNE200AA. For 1987-1997, see Statistics New Zealand (1996, 1997, 1999).

12 Details in the statistical appendix.

13 In practice this means that all cash withdrawals by owners from the relevant businesses, which are subject to regular personal income tax, are treated as payments for labour services, notwithstanding that in the case of some businesses the sums may be very large and will include some operating surplus and economic rents.

14 See Statistics New Zealand 2010, p.9 Table 4 for a concordance. Our industry classifications prior to 1972 remain tentative.

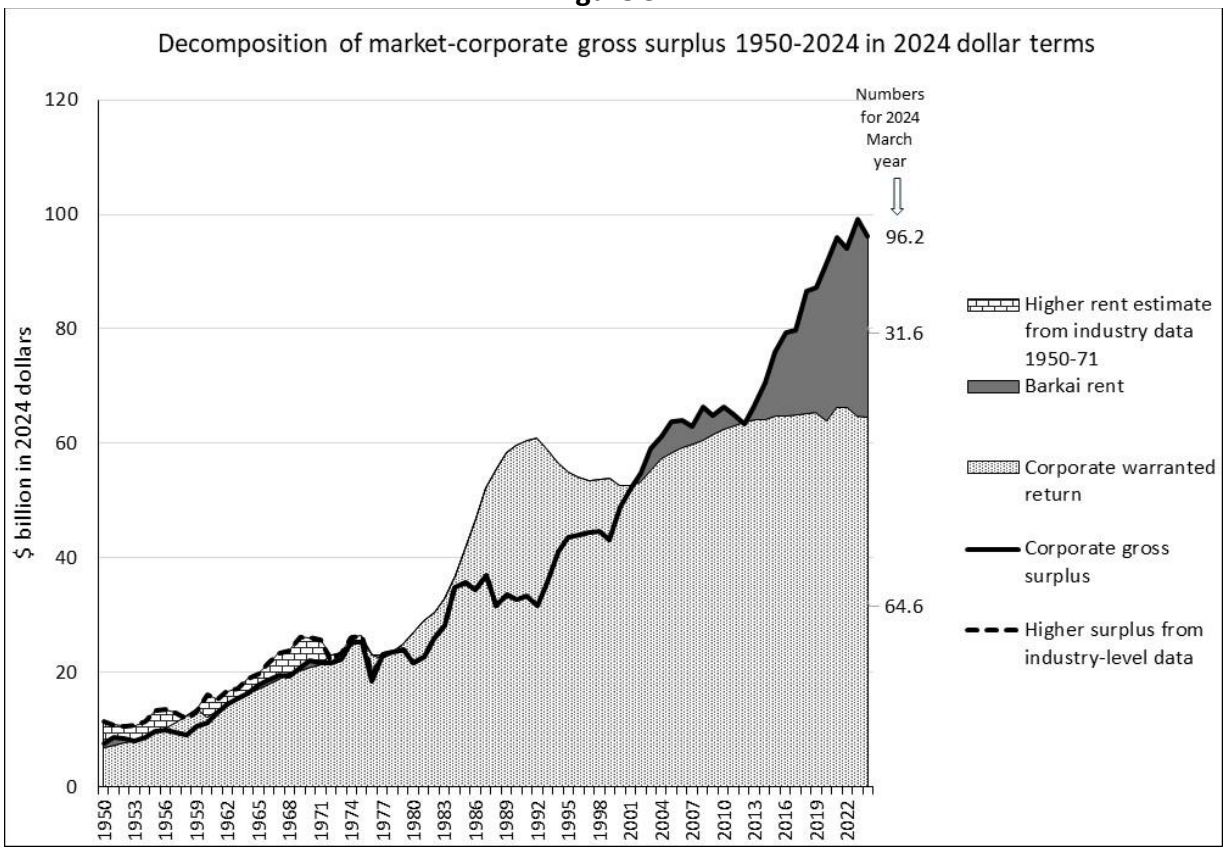
Statistics (1954, 1955), Gillion and Frankel (1967), Philpott (1994), successive *Official Yearbooks*, and the annual publication *Incomes and Income Tax*.

This data work provides the basis for calculating, for market-sector corporate enterprise, a competitive required return on investment in fixed capital. Estimates of Barkai rent are then derived by comparing this with actual gross surplus. Detailed results are in Table 9 of the Statistical Appendix.

5. Results

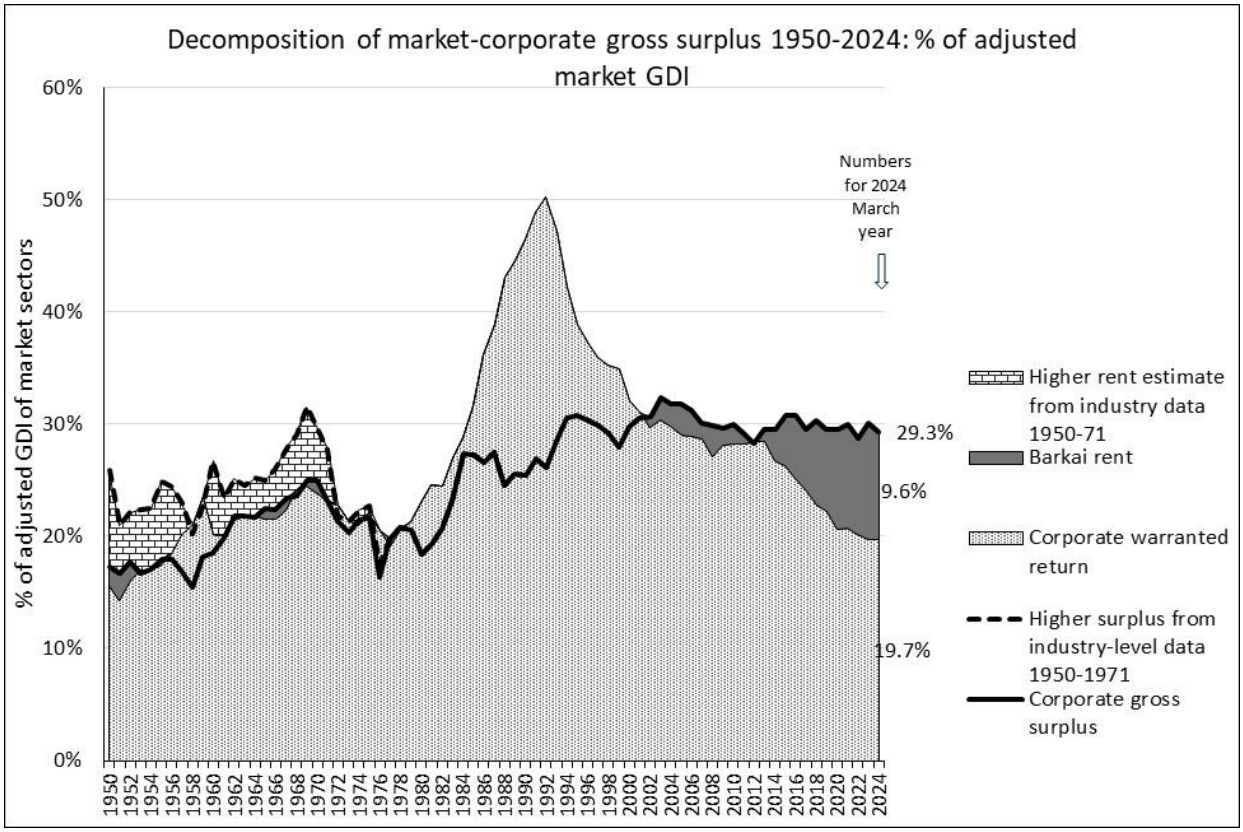
Figures 5 and 6 show the aggregate top-down results for market-sector corporate enterprise, with high and low estimates for the years 1950-1971 to take account of conflicting numbers for total market-sector gross surplus. Estimated Barkai-rent has grown rapidly since 2000, with an acceleration since the Global Financial Crisis. In the year ended March 2022, of total gross market surplus of $94.6 billion, $65.9 billion (70% of the total) is estimated to have represented the required cost of capital and $28.6 billion (30% of the total surplus and 8% of adjusted market GDI) is Barkai rent. These rent numbers are lower-bound because, as the detailed industry-by-industry calculations reported in Figure 10 below show, positive rents in some industries have here been offset in the aggregate numbers by negative excess returns in others. When only positive-rent industries are aggregated the number for total Barkai rent rises to $33 billion.

Figure 5



Source: Table 8 in the statistical appendix.

Figure 6



Source: Table 8 in the statistical appendix.

Figures 1, 5 and 6 show three distinct periods. Prior to the mid-1980s there was probably a flow of Barkai-rent (with a gap in the recession years 1958-59) of uncertain scale, that petered out during the 1970s. There was then a period of no aggregate Barkai-rent until 2002, after which rents recovered to 2-3% of GDI until the GFC. Thereafter the recent increase gathered pace, reaching 8% of adjusted market GDI in the early 2020s.

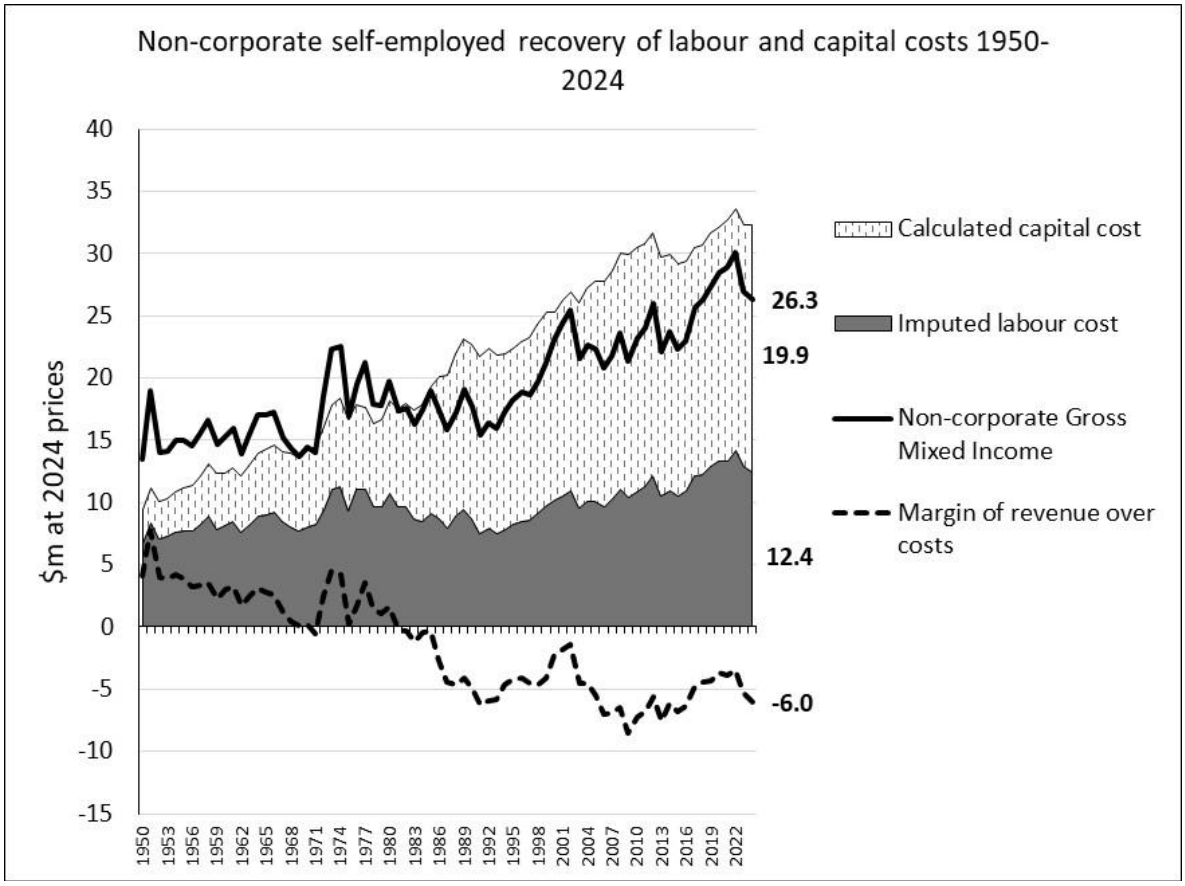
The squeeze on Barkai-rent in the 1980s is remarkable, and has two contributing factors: a sharp increase in the required return on capital (due to high inflation over the preceding decade, which built a high WACC into the expectations of the model's representative firm); and a drop in realised surplus 1986-1992 due to a policy-induced recession. The excess of required return over realised surplus during the 1980s and 1990s in Figure 5 represents disappointed expectations rather than actual losses[15] – gross surplus in real dollar terms actually doubled between 1980 and 2000 – but nevertheless helps to account for the strong political support from the business community for neoliberal policies introduced in the late 1980s and early 1990s. It probably also helps to account for the falling-away of corporate investment in productive assets seen in Figure 4.

Following Barkai (2020 p.2422), we interpret the rising rent share as indicative of increasing market power. This is consistent with a recent rise in public concern about excess corporate profits and a consequent series of market studies by the New Zealand Commerce Commission.

[15] The possibility that this indicates some model-mis-specification is discussed below.

A by-product of the work on separating out the non-corporate self-employed from the aggregate data is a decomposition of their GMI, shown in Figure 7. From 1950 until about 1980 a positive margin of GMI over imputed labour and capital costs is seen, switching to a deficit thereafter. This is consistent with a transition from predominantly high-income groups (farmers and professionals) to a more diverse group, with many precariously-employed small contract workers on one hand and some very highly paid groups in the professions, medicine, and finance on the other. In the earlier period, it is likely that rents were widespread. In the current period, it is probable that rents continue to accrue to the high-income professional self-employed, while low-income "contractors" may not even receive a return on their capital employed.

Figure 7

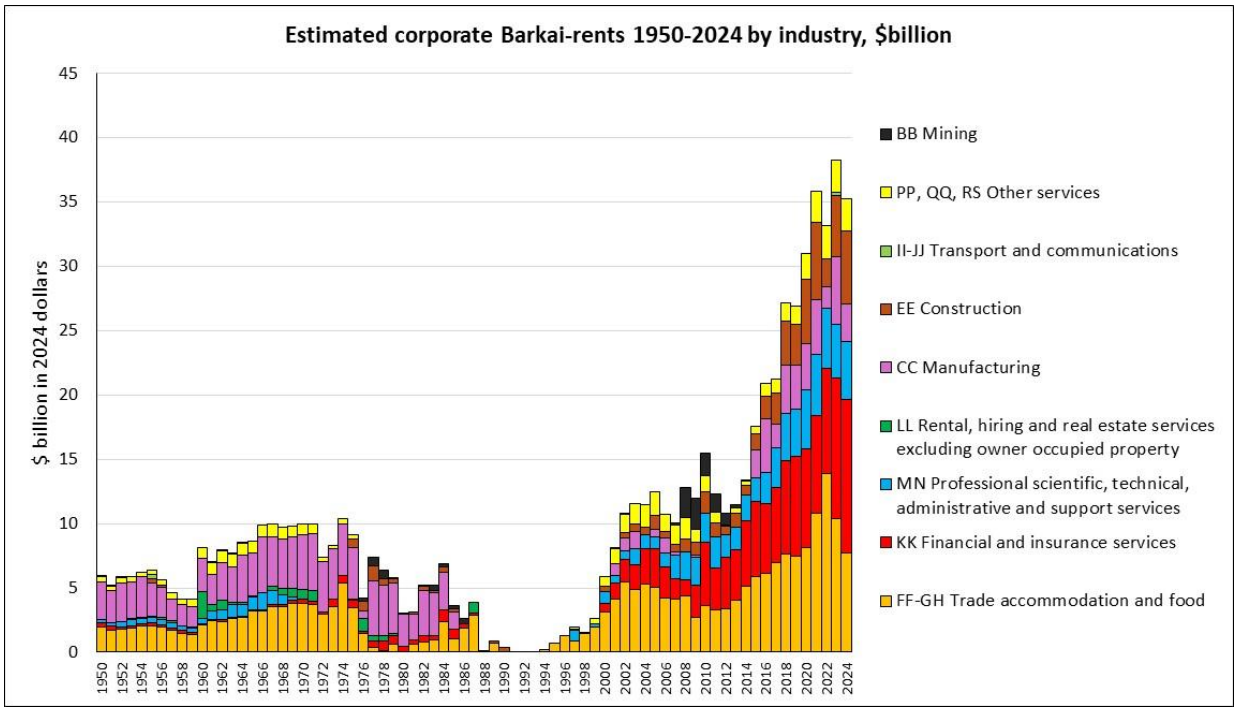


Source: Table 8 in the statistical appendix.

Having found evidence of substantial rent accruing in aggregate terms to the market corporate sector, it remains to be seen in which industries these rents are secured. Figure 8 shows the breakdown of positive corporate rents[16] in constant dollar terms, while Figure 9 shows the same information expressed as percentages of adjusted market GDI. It is immediately obvious that rents in manufacturing, which were significant in the era of import controls and industrial policy before the 1980s, have been greatly reduced in the past three decades as finance, business services, trade and construction have become the dominant sources of corporate rent.

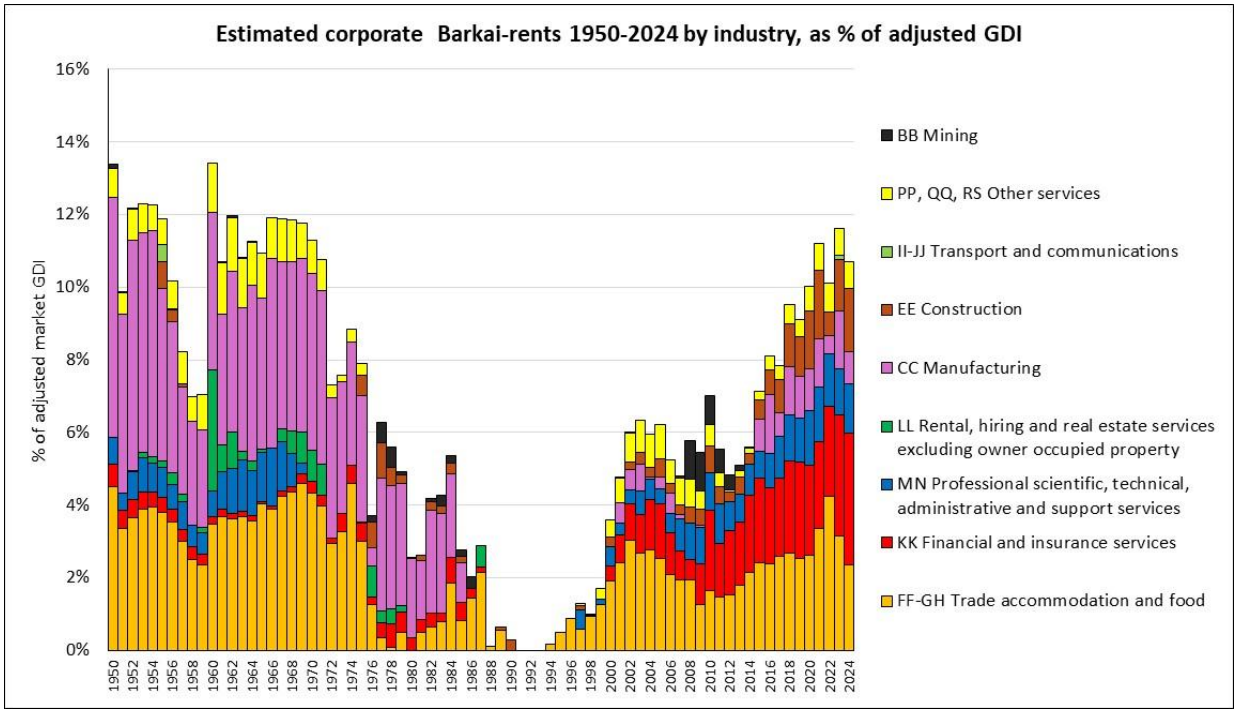
[16] Industries with zero or negative rents have been suppressed in Figures 8 and 9.

Figure 8



Source: Table 9 in the statistical appendix.

Figure 9



Source: Table 9 in the statistical appendix.

It will be observed that the total rents in Figure 8, of around $35 billion p.a., in the early 2020s, have added up to a larger total than the aggregated calculation in Figure 5 of around $29 billion p.a., because in the latter the occurrence of negative excess profit in some industries pulled down the aggregate. This is seen in Figure 10 which shows the industry distribution of both positive and negative excess surplus. From 1950 up to 1980 the balance between

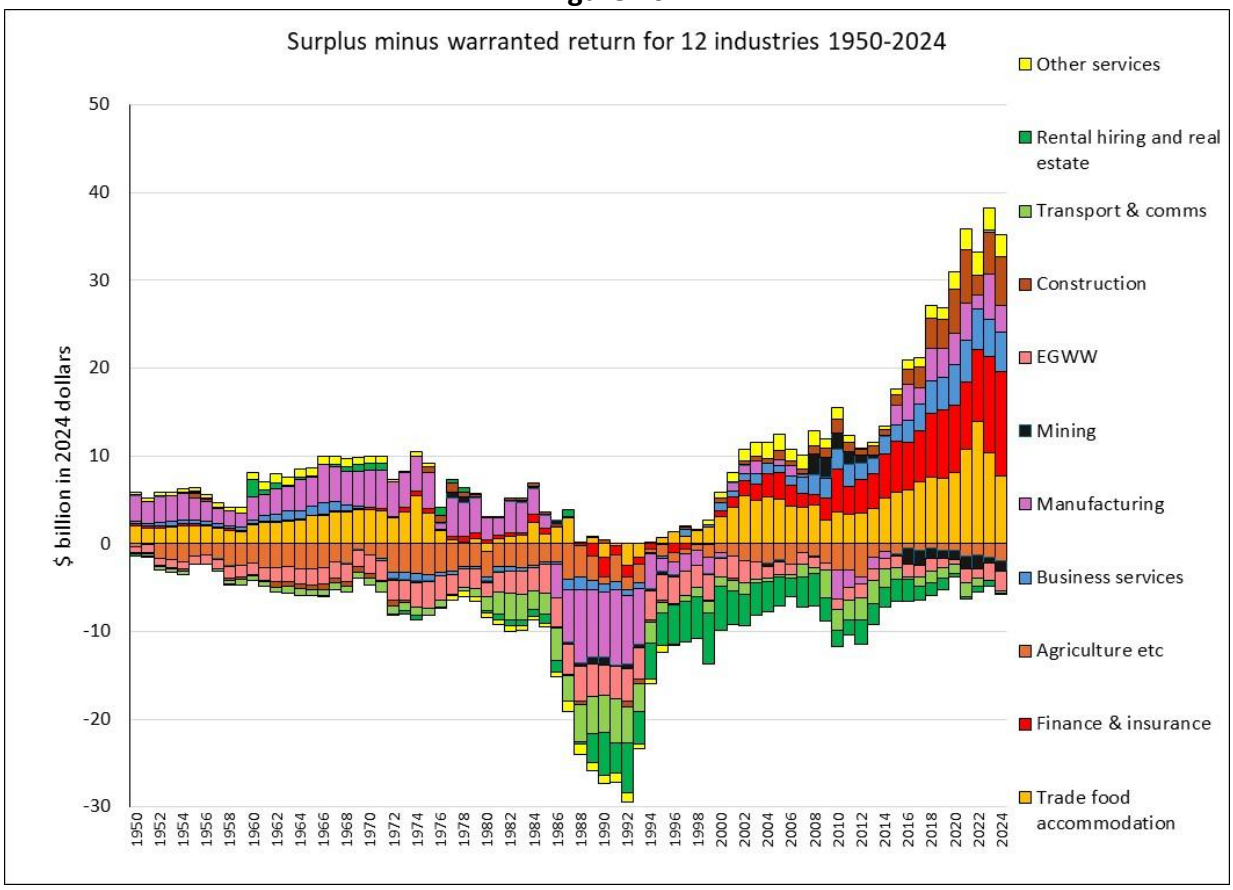
positive-excess and negative-excess industries was quite finely balanced, producing the industry-data-based Barkai-rent estimate of around 4-6% of adjusted GDI in Figure 1. In the 1980s and 1990s negative excess prevailed, bringing Barkai rent to zero on both measures in Figure 1. Since 2000 the positive-rent industries have dominated as the negative-excess results for other industries have shrunk. It is likely that if we were able to disaggregate the industries further, positive rents would be even larger. For example the Trade, Accommodation and Food sector includes both highly profitable supermarkets and potentially low-profitability small retail outlets, cafés and restaurants.

A couple of the negative-excess industries in Figure 10 are surprising at first sight. "Agriculture, forestry and fishing" is consistently negative, but this is because the great bulk of activity in this sector since 1950 has been undertaken by the non-corporate self-employed, and the removal of all GMI of both corporate and non-corporate self-employed from the industry total surplus has left an estimated corporate residual insufficient to cover the warranted return on corporate invested capital. This result is almost certainly an artefact of the conservative approach taken to estimating the residual corporate surplus for this industry, in particular the subtraction of "corporate gross mixed income" which is likely to have included a large component of surplus in excess of actual labour cost. (In addition, unmeasured capital gains are significant in this sector.)

"Rental, hiring and real estate" is another consistently negative industry in Figure 10, but in this case a very large amount of GFCF over recent decades was undertaken in the justified expectation of (untaxed) capital gains, rather than a flow of operating surplus. "Electricity, gas, water and waste services" has been attributed a very high required return in the calculations, reflecting the massive public-works construction programme from 1950 to 1990 which left a large stock of constructed landscape assets that have been assigned 50-year lives in the model. The Barkai model therefore attributes no rent to this sector despite evidence of high profits since it was corporatised and part-privatised in the 1980s and 1990s. The negative results for the mining sector in the past decade possibly reflect the lack of success from costly new drilling for oil and gas.

Most striking of all is the strongly negative showing of manufacturing in the 1980s under the combined impact of import liberalisation and the failures of a Government-promoted investment programme in heavy industry between 1977 and 1990. Premised on a very high predicted oil price, these investments dragged down the aggregate performance of several industries over the following decades, and in our analysis may hide rents being received by other firms within those same industries. Only in the last decade has manufacturing recovered some of its erstwhile rent level.

Figure 10



Source: Table 9 in the Statistical Appendix.

6. Intangibles

One possible explanation for the rise in Barkai-rents is that there are forms of intangible assets (inputs to production which cannot be seen or touched such as, for example patents, intellectual property, and "goodwill") which are unrecognised in the national accounts, and that the returns to capital in excess of the conventionally-measured capital cost in Figures 5 and 8 represent the warranted return on these unrecognised assets.

The role of intangible assets in generating value added has been the subject of a substantial literature. O'Mahony et al (2021) found evidence of intangible capital as a driver of increased markups (economic rent) and hence of a declining labour share. Sandström (2020) found evidence of a positive relationship between intangible capital and average industry markups, but inconclusive evidence of its relationship to economic profits. Crouzet and Eberly (2021, 2019) also found an association between intangibles and rising markups, and Crouzet, Eberly, Eisfeldt and Papanikolaou (2022) argue "that rents associated with intangible assets have contributed to a sharply rising share in the growth of total enterprise value of U.S. businesses since the early 1990s". (See also Corrada et al 2012, 2016, 2022; Crouzet and Eberly 2023; Farhi and Gourio 2019; Ocean Tomo 2022).

The central issue is whether the hypothesised unseen but productive assets were produced (created by the diversion of scarce real resources from alternative uses) or non-produced[17] (simply appearing as a gift of nature, as with the "Solow residual" in growth theory). In the first instance, an orthodox process of accounting for unrecognised intangible assets leaves our Barkai rent estimates virtually unaffected[18].

In the second case, the relevant stream of income to the possessors of intangible assets is a form of rent along with all the other components of total economic rent, since the income flow is determined by the scarcity value of the non-produced intangible and not by any cost of supplying it. Since there are no costs[19] of their production, hence no required rate of return, any return is an economic rent. In a sale of the asset, the economic rent will be incorporated into its market value.

Beyond these theoretical grounds for setting aside intangibles as the explanation for Barkai rent, the question arises of their empirical effects. Chappell and Jaffe (2018) investigated the economic impact of intangible capital in New Zealand, using very limited measures drawn largely from firms' reports as to whether expenditure had occurred or not. They found no impact on productivity or profitability. While the test was weak, it is consistent with produced but unmeasured intangible assets playing a very minor role, if any, in generating profits in New Zealand. This would also be consistent with the record of weak firm performance and poor productivity growth in New Zealand in recent decades. There is no sign of the sort of surge in productivity since 2000 that might have been associated with the steep increase in Barkai rents if those rents reflected a surge of inputs from productive intangible assets.

Barkai (2020 section IV.C pp.2438-2444) came to a similar conclusion. He tested the robustness of his findings by adding intangible capital values from the INTAN-Invest database to the national accounts, but found that adding the new assets "accounts for pure profits that are on average equal to 0.3% of gross value added and that never exceed 1.52% of gross value added." He described this as having "modest effects on the level of pure profits" and concluded that the inclusion of intangibles did not change his results.

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17 See United Nations Statistical Division 2008 p.43 for the distinction. Also Statistics New Zealand 2014 p.13 Figure 3.1.

18 Insofar as costs have actually been incurred by whichever parties are claimed to have acquired ownership of previously unrecognised intangible recognised assets, those assets are produced assets. Any expenditure which creates benefits to the economic owner over more than one accounting period is considered investment in an asset (UNSD 2008 p.617). When firms undertake such expenditures, insofar as those expenditures are not already recognised as capital formation in the national accounts they must have appeared as intermediate purchases, or compensation of employees. Shifting the relevant items from those cost categories into GFCF would immediately increase GDP as conventionally measured, which in turn would mean increasing the recorded amount of "gross operating surplus and mixed income", leaving largely untouched the already-recorded flow of surplus on which our calculation of Barkai-rent rests. Whether bringing these produced intangibles into the national accounts raises or lowers the total net surplus, and hence the level of Barkai rent, depends on whether the cost of investment in new intangible assets is greater or less than the amount of depreciation of those assets.

19 That is, costs that are recognised and recorded in the national accounts.

7. Is the model mis-specified?

Karabarbounis and Neiman (2019 p.168) have suggested that there may be "time-varying risk premia or financial frictions that generate a wedge between the imputed rental rate R using a Hall-Jorgenson formula and the rental rate that firms perceive when making their investment decisions". In other words the true cost of capital on an ongoing basis may not be correctly captured by equation (2) above. This suggestion was prompted partly by their observation of a spike in required returns in the 1980s similar to what has been found here for New Zealand.

The possibility of such a wedge directs attention to the basic intuition behind the Barkai model and possible weaknesses in the story it tells with respect to the disappearance of Barkai rents in the New Zealand data in the 1980s and 1990s, when our calculations show negative excess returns to capital.

The model's attribution of capital costs to each vintage of actual GFCF in the New Zealand economy from 1949 to 2021 rests on the notion of revealed preference: the investment was undertaken by entrepreneurs who observed the risk-weighted interest rates, tax rates, and inflation rates that prevailed around the time when the investments were undertaken, and this is taken as evidence that the anticipated returns on the investment sufficed to outweigh the observable costs. With perfect competition in all markets and perfect foresight of entrepreneurs, Barkai rent over the period of analysis ought to have turned out zero. But with neither perfect competition nor perfect foresight in reality, returns have diverged massively either side of the cost of capital given by the Hall-Jorgenson formula.

In thinking about this there are two fundamental asymmetries from economic theory to bear in mind. First, firms are assumed to maximise profits, which under imperfect competition means they have a permanent incentive to increase margins whenever possible. Second, the process of competition, insofar as it is effective, places permanent downward pressure on prices and margins and drives less-efficient producers out.

The Hall-Jorgenson-Barkai model sets as its benchmark a stream of capital costs that are set in stone at the point each investment is undertaken, and that hold good for the full life of the asset. Financing for the investment is assumed to come from a mix of equity and debt, with the debt incurred for the full asset life with no re-financing. Assets are assumed to remain productive for their full notional life. And the economy as a whole, or each industry as a whole, is treated as a single firm without regard to the possibility of exit. These are convenient simplifying assumptions to make the analysis tractable, but they need to be borne in mind when evaluating the results.

Consider first the negative excess in the 1980s and 1990s. Clearly, given the combination of a falling inflation rate after the 1970s and high nominal interest rates on loan finance in the 1970s, the realised returns on investments undertaken in the 1970s fell below their Hall-Jorgenson required level – but in practice most firms would have been able to refinance their loans during the 1980s at lower interest rates, and some capital stock would have been written off or written down in the face of sluggish markets. Hence our required-return series through those decades overstates the actual stringency faced by investors: expectations were not borne out, but markets delivered compensation for much of that by opening up refinancing

opportunities at lower interest rates, and not all the physical assets that have been assumed to be retained for their full life in the Hall-Jorgenson equation were in fact so held. The asset inventory in the model is therefore likely to be overstated, as is the cost of loan finance, through the two decades when the model's required return spikes.

Notably missing from the Barkai model is any treatment of capital gains on assets held, apart from the inclusion of the expectation of such capital gains as a deduction from the initial cost of capital in equation (2). However, given that the initial investment decision is modelled as being motivated in part by the anticipation of capital gains, it is worth noting that the actual outcome of asset-price changes is not included in the model's returns to investment, which are restricted just to the flows of surplus and mixed income in the national accounts. This is clearly an area for future work.

Of course, low returns in one period are not to be treated as offsetting higher returns in other decades. Byegones are byegones, and each year's actual GFCF reveals forward-looking willingness to invest given the interest, inflation and tax situation prevailing in that year. The capital cost calculation already incorporates risk, so no justification for above-normal profits in the 2000s and 2010s is to be sought in the low numbers of the 1980s. Investments made in higher-interest periods may have been refinanced in subsequent low-interest-rate periods and in fact be making higher returns than our calculations show, but that wouldn't explain the high returns that our calculations do show during those periods. Investments made under low interest rates should not give rise to excess profits if there is a competitive situation.

Consider next the way the model calculates the net capital stock by a perpetual-inventory technique that adds each year's capital formation and subtracts that year's depreciation at asset-specific rates. This means that historically large investments in structures and land improvements that were made on a non-profit basis during the mid-late twentieth century, in industries that are now classed as "market" activities, have been entered into our data at their full estimated historic cost, and have been depreciated over an assumed 50-year life. For example, the "electricity gas water and waste" industry is modelled as still carrying the capital costs of a major hydroelectric construction programme that culminated in about 1990, while the transport industry still carries the cost of Main Trunk Railway electrification in the 1980s – both of them projects that would never have been undertaken as the sort of commercial decisions assumed by Hall-Jorgenson calculations. The absence of Barkai rent in our results for the electricity industry is thus largely an artefact of assuming that the sector's capital formation from 1950 to 1990 was a revealed-preference profit-oriented calculation when in fact this was infrastructural investment undertaken on public-good grounds.

8. Conclusion

The step-change since the 1980s in the primary income distribution shown in Figure 2, in favour of an increased share of corporate surplus (return on fixed capital investment, and rents from asset ownership) is the main focus of this paper. Applying the model of Barkai (2020) to the New Zealand data, we have found a dramatic rise of market-corporate surplus in excess of the cost of capital over the past two decades, reaching possibly as high as $35 billion p.a. (10% of adjusted GDI) by the early 2020s.

If the period since the 1980s had witnessed a sharp increase in the economy's capital-labour ratio, the increased gross surplus might have reflected the familiar neoclassical cost of capital applied to a sharply increased stock of productive fixed assets and a rising capital-output ratio. But this did not happen; the New Zealand economy remains capital-shallow (Productivity Commission 2023 pp.56-58 and Figure 3.7), and there is no evidence that a rising tide of capital formation has underpinned the increased surplus being appropriated by corporate enterprise. Had the economy experienced, since the 1990s, a massive infusion of intangible productive capital that failed to be recorded in the official statistics of GFCF, but which accrued as profit to the owners of this unrecorded capital, this ought to have shown up as a substantial increase in measured productivity - but there is no sign of this in the statistics. This leaves two possible causes: market power, or model mis-specification.

While the required-return spike in the 1980s that kills off the rent estimates for those years is arguably due partly to model mis-specification (especially the assumption that debt interest costs are paid at original interest rates for the full life of the debt, with no refinancing option, and the absence of any allowance for unanticipated capital gains), the increase in Barkai rent since 2000 seems robust, and an increased use of market power to drive up margins seems the most likely explanation.

The Barkai rents identified in this paper are just the rents that accrue as surplus to the economy's asset owners. There is quite likely to be an element of economic rent included in the national accounts' "compensation of employees" and in relation to so-called "corporate mixed income", but that would be additional to Barkai rent as measured here, which means that our estimates are a lower-bound for total rents in the economy.

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