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**New Zealand inequality and the
struggle between capital and
labour**

Jacek B Krawczyk and Wilbur Townsend

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NEW ZEALAND INEQUALITY AND THE STRUGGLE BETWEEN CAPITAL AND LABOUR

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ABSTRACT. This paper examines whether changes in New Zealand income inequality can be attributed to the shares of national income taken by capital and labour. Data on income inequality aggregates both capital income (rents, interest, profits) and labour income (wages and salaries). It is possible that changes in inequality correspond only to changes within the distributions of capital income and labour income, and that a rhetoric which emphasises the struggle between capital and labour is misguided. We find this is not the case: both an econometric analysis of income shares and a historical analysis of major policies demonstrates that the struggle between capital and labour matters.

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1. INTRODUCTION

Since Ricardo and Marx the rhetoric of inequality has been anchored to the struggle between capital and labour. To be wealthy is to be landed, to be a rentier. To be poor is to be landless, to be a worker. But of course there are both rich workers and poor workers, chief executives and manual labourers, and a pensioner living off their wealth might laugh at any suggestion of riches. In this paper we test the relevance of the capital-labour struggle to the history of income inequality in New Zealand. This is a companion paper to [Krawczyk and Townsend \(2015\)](#). That paper derives the factor ratio and demonstrates how it is affected by changes to the tax system.

We will refer to all capital income as rents, though more rigorously our data includes dividends, interest, profits and some capital gains.¹ We will refer to all labour income as wages. We will summarise the strengths of capital and labour with the factor ratio – total rents, less depreciation, divided by total wages.

It is worth exploring why an increased factor ratio should increase income inequality. If the wage and rent distributions are the same – perhaps because people save only to smooth their consumption into their retirement – it will not. As it happens, capital tends to be distributed much less equally than wages ([Piketty, 2014](#), tables 7.1, 7.2). When rents and wages are positively correlated (the top 1% of capital earners are more-or-less the same people as the top 1% of labour earners) this leads to a simple relationship between the factor ratio and inequality.² This paper examines the strength of that relationship.

Testing this relationship is challenging because we have no New Zealand data on wage inequality or rent inequality. All of our inequality data aggregates capital income and labour income into a single distribution. In Section 3 we regress inequality on the factor ratio. If the factor ratio correlates with wage inequality or rent inequality regression results will be biased. Thus we supplement our econometrics with a historical analysis in Section 4. Before these substantive sections we discuss our data in Section 2.

2. DATA USED

2.1. Income inequality. Our measure of income inequality is the share of income taken by top percentiles of earners – the top 10%, the top 1% and the top 0.1%. The

¹We will refer to data in the singular throughout. See [Rogers \(2012\)](#) for justification.

²When capital and labour income are negatively correlated – as they were in the 19th Century and as they are in contemporary models like [Turnovsky and García-Peñalosa \(2008\)](#) – an increase in returns to capital increases the income of some high-earners but not others, leading to a relationship less easily summarised.

study of income inequality is the study of a distribution, which no single statistic can fully describe. As demonstrated by [Atkinson \(1970\)](#) this is not a trivial concern. In his comparison of twelve countries, India is the third most equal by one measure and the eleventh by another.

Our use of income shares is justified first by their easy interpretation. Summary statistics like the Pareto coefficient (which parametrises the distribution to a Pareto distribution) and the ever-present Gini coefficient (which compares the distribution's Lorenz curve to one of complete equality) lack that easy interpretation, and shifts in them can correspond to shifts anywhere along the distribution. This means that fundamentally different economic trends can have an identical effect on the statistic. Percentile ratios – say, the cut-off to be in the top quintile divided by the cut-off to be in the bottom quintile – are popular with government statistical agencies, probably because they can be easily calculated from survey data.³ However they ignore the tails of the distribution and hence they ignore the extremes which correspond to the most visible inequality. It is this inequality – in particular the income of the very wealthy as compared to the rest – which has been the focus of recent popular rhetoric.⁴ This makes percentile ratios of limited use in assessing contemporary inequality. Further, given the focus of this study is on the relationship between income shares and the capital-to-labour income ratio it is relevant whether a person sitting at the 80th percentile will have a significantly greater proportion of her income coming from capital than her sister at the 20th. While New Zealand data is unavailable, research from America shows that capital income only dominates labour income in the top 0.1%.⁵ For the top 10% as a whole, labour income is still 76% of total income. If New Zealand trends are similar it is dubious whether someone sitting at the edge of the 80th percentile will have much capital income at all.

The more expedient reason why we use income share data is that it is available. We use data from the the World Top Incomes Database ([Alvaredo, Atkinson, Piketty and Saez, 2014](#)), which in turn is from [Atkinson and Leigh \(2007\)](#). They calculated the share of total income flowing to top percentiles by comparing tax data to national accounts data. Their data series is from 1921 to 2011 (though it is punctured by missing years, and the 0.1% share only exists until 1989). In contrast, estimates of percentile ratios and Gini coefficients are only available from 1954 and are of varying quality ([UNU-WIDER, 2014](#)). The series developed by [Easton \(1983\)](#) calculates a Gini coefficient approximately twice that of [Jain \(1975\)](#)

³Survey estimates of income shares with fat tails will be biased downwards unless the sample is very large.

⁴Famously in the Occupy Movement's slogan 'We are the 99%'.

⁵2010 data, where entrepreneurial income is included as capital income. From [Piketty and Saez \(2003, updated 2012\)](#).

for the mid-sixties, making both somewhat dubious. Statistics New Zealand data is only available from the early 1980s (Statistics New Zealand, 2014a).

For a full description of the data and its limitations, see Atkinson and Leigh (2007). Some of their caveats are worth emphasising. As their estimates of high incomes are from income tax data, they are affected by changes to the tax system. Quoting a 1953 New Zealand Census and Statistics Department report they tell us that "income-tax law is dynamic rather than static and there are few years in which amendments, some major and others minor, to the law have not affected the statistics". Thus year-to-year comparisons are unreliable and attention should be paid to longer-term trends. This will be relevant to our partial-differencing in Section 3. One particularly important change is the shift from a household tax unit to an individual tax unit in 1953. This increased our measures of income inequality by about 20%. The taxation of capital income has changed, with capital gains being treated differently over time and dividend imputation being introduced in 1989. The introduction of fringe-benefit taxation in 1985 also increased measured inequality by inducing employers to compensate employees with salaries as opposed to "low interest loans, company vehicles or retirement income schemes". The coincidence of these reforms with the others of the 1980s is unfortunate.

While Atkinson and Leigh's numerator – the quantity of income taken by high-earners – is derived from tax data, their denominator – total income – is derived from national accounts. Only taxable household income is included. This excludes universities, charities, life assurance funds and the imputed rent from owner-occupied housing. The tax-treatment of transfer payments has changed over time, with all benefits being taxed from 1986. Atkinson and Leigh include transfers in total income in all years. However, income (both top income and total income) is measured gross of tax. This leads to some odd conclusions. A simultaneous increase in both tax and transfers will increase total income while leaving high incomes unchanged.⁶ Thus the policy would unambiguously decrease our measure of inequality, regardless of its overall progressivity. This is an unfortunate implication but is unlikely to affect our analysis as most increases in the size of the welfare state will (hopefully) be progressive.

2.2. The factor ratio. This paper compares inequality to the factor ratio. With the factor ratio denoted as χ (as in Krawczyk and Townsend (2015)), $\chi = \frac{\bar{r}k}{wl}$, where \bar{r} is net of depreciation.

We derive the factor ratio from the income measure of national accounts, for which we have data from 1939. Data from 1972 were obtained with Statistics New

⁶At least assuming high earners do not receive welfare – a somewhat tenuous assumption given New Zealand's universal superannuation.

Zealand's Infoshare tool, older data was obtained from the latest revision available in the New Zealand Official Yearbooks. The adoption of the United Nations' SNA standard in 1978 (backdated to 1972) means data before and after the split are not strictly consistent (Statistics New Zealand, 2004b, p. 106). However analysing crossover years suggests this problem is not substantial: in 1975 labour income was \$5762m under the old system, it was \$5444m under the new system; capital income was \$3172m under the old system and \$3191m under the new.⁷ Before the change, labour income is 'Salary and Wage payments' + 'Pay and allowances of armed forces'. Capital income is 'Rental value of owner-occupied houses' + 'Other personal income (excluding company dividends)' + 'Company income (before distribution)'. After the change labour income is 'Compensation of employees' and capital income is 'Operating surplus'. Note capital income is net of depreciation in the first system. The second system initially published figures net of depreciation but now publishes them gross; we have constructed net figures ourselves.

A much more substantial shift is the treatment of depreciation. Before 2000, depreciation was measured from tax returns (Statistics New Zealand, 2000).⁸ Depreciation was therefore at the discretion of whatever accounting system firms used to spread costs over time, which could be "manipulated arbitrarily", and it did not necessarily account for shifts in the price level (Statistics New Zealand, 2014b). After 2000, depreciation was measured using an age-efficiency profile, a model of how an asset deteriorates over time. While the change has been somewhat obscured by other changes in the national accounts, Statistics New Zealand told us in correspondence that the change increased 1994 market consumption of fixed capital by \$2387m (3% of GDP) and thus decreased operating surplus by the same amount. This change has been incorporated into the back-dated SNA standard to 1972.

Our factor-ratio series is gross of direct taxes and transfers. As the data is from national accounts direct taxes are ignored (although net of tax figures are available for 1939 to 1955, before the process was standardised). Transfer data is available, either from the national accounts directly (prior to the adoption of the SNA standard) or from government spending data. Including transfers might increase the explanatory power of the factor ratio but it would do so at the cost of disguising whether reductions in inequality correspond to government spending or more structural change. National accounts data is net of indirect taxes.

We use the tax system to constrain inequality in Krawczyk and Townsend (2015) so the relevance of a factor ratio that ignores tax needs justification. Intuitively, if the gross factor ratio changes gross inequality the net factor ratio will change net

⁷Compare the 1975 listings in the monthly abstracts of statistics of 1976 and 1984. Note both figures ignore the later change to depreciation described in the next paragraph and are thus not this figures we use.

⁸Depreciation is referred to as 'consumption of fixed capital' in national accounts.

inequality. Formally, where τ_{top} is the average tax rate on top incomes, τ_{total} is the average tax rate in all incomes, τ_k is the average tax rate on capital income and τ_l is the average tax rate on labour income:

$$\begin{aligned}
 \text{gross income share} &= \frac{\text{gross top incomes}}{\text{gross total incomes}} \\
 &= \beta(\text{gross factor ratio}) &= \beta \frac{\text{capital income}}{\text{labour income}} \\
 \Rightarrow \text{net income share} &= \frac{\text{net top incomes}}{\text{net total incomes}} &= \frac{\tau_{\text{top}}(\text{gross top incomes})}{\tau_{\text{total}}(\text{gross total incomes})} \\
 &= \frac{\tau_{\text{top}}}{\tau_{\text{total}}} \beta(\text{gross factor ratio}) &= \beta \frac{\tau_{\text{top}}(\text{capital income})}{\tau_{\text{total}}(\text{labour income})} \\
 &\approx \beta \frac{\tau_k(\text{capital income})}{\tau_l(\text{labour income})} &= \beta(\text{net factor ratio})
 \end{aligned}$$

The approximate equality is justified where $\frac{\tau_{\text{top}}}{\tau_{\text{total}}} \approx \frac{\tau_k}{\tau_l}$. This will be the case when most income is labour income but most top income is capital income. From the theory outlined in the introduction we know that this will be the case when β is significant. Provided $\tau_{\text{top}} \geq \tau_{\text{total}}$ and $\tau_k \geq \tau_l$ we can be sure that the relationship between gross income shares and the gross factor ratio will at least move in the same direction as the relationship between the net incomes shares and the net factor ratio.

Finally, no adjustments have been made to Statistics New Zealand's treatment of the self-employed. Conversations with Statistics New Zealand staff suggest that this is unlikely to be an issue at the level of aggregation we are considering.

3. TIME SERIES ECONOMETRICS

In this section we will formally test the relationship between the factor ratio and inequality. As mentioned, we cannot control for the distributions of rents or wages. If the factor ratio tends to increase with inequality in the wage and rent distributions – perhaps because some governments care less about inequality and all its causes – this will bias our results upwards. Of course if we think that the factor ratio might increase inequality *by* increasing inequality in the rent or wage distributions – perhaps greater returns to capital also increases the returns of those workers best placed to use that capital – controlling for distributions of rents or wages would bias our results downwards. Ideally, we would calculate both controlled and uncontrolled estimates and thus infer upper and lower bounds on the effect. As we cannot do this, we try to resolve the missing variable bias by comparing estimates for the 0.1%, 1% and 10% shares. Assuming higher incomes receive a higher proportion of

their income from capital, we can expect a tighter correlation between the factor ratio and the income shares higher up the distribution. However if the factor ratio correlates more closely with wage or rent inequality higher up their distributions this approach will still be biased.

Our goal cannot be to exactly parametrise a mathematical relationship, and we will discuss parameter estimates in relative terms. Further, we will supplement our parameter estimates with R^2 estimates, to gauge the more modest understanding of the basic salience of the factor ratio. Our interest in the R^2 suggests we should conduct simple regressions on only the factor ratio without including any controls. This would bias our results if we were worried that the factor ratio might only appear to increase because it tends to increase when, say, GDP growth increases. But for this to be a concern we would have to be worried that GDP growth might impact the wage and rent distributions, and it seems hubristic to include only some determinants of those distributions. Thus we follow our simple tests with controlled tests, but only to provide a rough estimate of the extent to which our estimates may be inflated by colinearity between the factor ratio and rent or wage inequality. Our controls when we do include them are inflation, GDP growth, nominal interest rates, and the proportions of GDP representing the agriculture sector, the manufacturing sector, welfare spending and other government spending. The series are generally taken from [Statistics New Zealand \(2004a\)](#), extended with Statistics NZ's infoshare tool. The exceptions are the data on government spending from 1972, which is from [The Treasury \(2014\)](#) and the most recent interest rate data which is from [Reserve Bank of New Zealand \(2015\)](#).

Unsurprisingly, our time series data is serial correlated. Specifically our data shows order one auto-correlation.⁹ As mentioned above, year-to-year comparisons are unreliable for tax data. Further, if capitalists shelter their income in companies to smooth their income and thus minimise their liability under progressive taxation, an anomalously large capital income in one year may be paid out in dividends over several years. Thus our variables are more likely related in levels than in differences, and resolving the serial correlation with partial-differencing is unreliable. We compute both partial-differenced FGLS estimates and (inefficient) OLS estimates

⁹Regressing simple OLS residuals on three lags gives the t_{-1} lag p-values 6.6e-06, 0.00182 and 0.0242 for the 10%, 1% and 0.1% shares. The t_{-2} and t_{-3} lags are not significant. The same test, repeated for the multiple OLS, gives weaker t_{-1} p-values 0.0143, 0.124 and 0.103. We take the conservative route and assume AR(1) for all our regressions.

with AR(1)-robust standard errors.¹⁰ It is worth remembering that the standard estimate of R^2 is consistent even for serial correlated data.

| | Simple OLS | | | Simple FGLS | | | Controlled OLS | | | Controlled FGLS | | |
|------------|------------|------|----|-------------|------|----|----------------|------|----|-----------------|------|----|
| | Estimate | R2 | N | Estimate | R2 | N | Estimate | R2 | N | Estimate | R2 | N |
| 10% share | 6.53 * | 0.14 | 68 | 8.60 ** | 0.12 | 64 | 1.04 | 0.65 | 60 | 3.52 | 0.59 | 49 |
| | (3.98) | | | (2.91) | | | (3.12) | | | (3.50) | | |
| 1% share | 6.66 *** | 0.39 | 68 | 4.83 *** | 0.17 | 64 | 2.98 | 0.69 | 60 | 3.04 | 0.61 | 49 |
| | (1.58) | | | (1.33) | | | (1.87) | | | (2.23) | | |
| 0.1% share | 1.62 *** | 0.58 | 45 | 1.43 *** | 0.41 | 40 | 0.65 | 0.74 | 37 | 1.06 * | 0.66 | 25 |
| | (0.29) | | | (0.27) | | | (0.43) | | | (0.55) | | |

2-sided p-values: *** < 0.001 < ** < 0.01 < * < 0.1. Standard errors in parentheses.

TABLE 1. The relationships between inequality and the factor ratio.

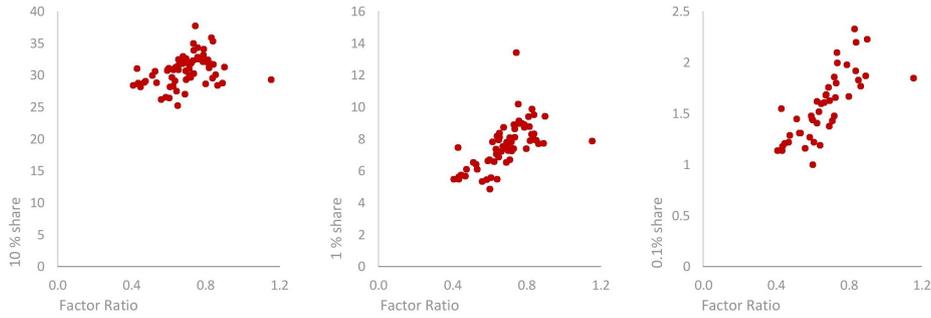


FIGURE 1. 10%, 1% and 0.1% income shares, vs. the factor ratio.

Table 1 summarises our results, with simple plots of income shares and the factor ratio in Figure 1. All three of our simple OLS estimates are positive, significant and able to explain a substantial proportion of the variation in inequality. This is strong evidence that *some* relationship exists between the factor ratio and inequality. Further, as we move up the income distribution our estimates are more significant and able to explain an increasing proportion of variation. This is what we would hope: while inequality towards the middle of the distribution may still be caused somewhat by wage inequality, at the extreme end much income is from capital and so increases in their wealth will be reliant on greater returns to capital. In fact the parameter estimate on the 10% share is similar to that on the 1% share. As both have as their units 'percentage points of total income', this suggests that

¹⁰Our FGLS estimator is the minimum-variance estimator derived in Prais and Winsten (1954). Following (White, 2001, p. 3), the variance of our OLS estimator is $(X'X)^{-1}X'\Omega X(X'X)^{-1}$, where Ω is the covariance matrix of the errors. Assuming the errors u_t are homoskedastic with variance $= \sigma^2$ and AR(1) with $u_t = \rho u_{t-1} + \nu_t$, $Cov(u_{t-1}, \nu_t) = E(\nu_t) = 0$: $Cov(u_t, u_{t-k}) = \rho^k \sigma^2$ for $k \in 0, \dots, t-1$.

when the factor ratio increases the income of the top 10% it is only really increasing the income of the top 1%. The same cannot be said for the top 0.1%, but their estimate is more than a tenth of the 1% parameter and thus they do benefit disproportionately. Again, the parameter estimates should not be taken as gospel; they are the result of both the direct effect of the factor ratio and the unobserved endogenous effects through inequality in rents and wages. Still, this provides strong evidence that the factor ratio matters, particularly to inequality at the highest end.

Our qualms about differencing were misplaced. The FGLS estimates are similar to the OLS estimates. The only substantive difference is that the 10% parameter is now larger than the 1% parameter – though not proportionately so.

As mentioned, the controlled estimates should be used only as rough estimates of the extent to which our simple estimates might be biased. Here we can take hope – while our estimates are now mostly statistically insignificant they are still positive and in the same order of magnitude as the simple estimates. The statistical insignificance will largely be due to colinearity between the many explanatory variables and the eight years of missing data for the regressors. As our parameters still have a positive sign, and demonstrate increasing R^2 and significance further up the income distribution, the controls give us no reason to view the relationship between the factor ratio and inequality as caused only by bias. We have not recorded the parameters on the controls because they are likely to be endogenous and so scientifically dubious. For example, despite the fairly simple negative relationship between welfare spending and our measure of inequality discussed in Section 2, our regressions suggest that a percentage point of extra welfare spending increases the 1% share by 0.39 percentage points. This is presumably because welfare spending increases in response to increased inequality. We do analyse some of the controls in the next section.

4. ECONOMIC HISTORY

Our econometrics have shown that there is a strong relationship between inequality and the factor ratio. We will now look into the nature of that relationship by exploring the historical context of our data, with particular regard to how it changed in response to changing government policies.

4.1. 1945 to 1984: political stagnation; economic revolution. The post-war economy is often derided as close-minded, unambitious and colonial. In 1950 New Zealand was the sixth wealthiest OECD country, forty years later it would be the nineteenth (Easton, 1997, p. 15). Singleton and Robertson (2002, p. 25) said that New Zealand was "dealt poor hands and played them very badly". Whatever truth there may be in this, in the forty years from the end of World War Two

income inequality dropped significantly. The 1% share peaked at 9.9% in 1953 after increasing since the War. By 1986 it had dropped to 4.9%. In 1953 the top 0.1% was receiving 2.3% of national income, in 1986 they were receiving only 1%. Figure 2 shows shifts in the incomes shares and the factor ratio indexed to 1945=100 for easy comparison. Note that the 10% share dropped proportionately less than the 1% share, which in turn dropped less than the 0.1% share. It seems that the highest incomes were dragged down by the dropping factor ratio. While the political paradigm – micro-managed economy, strong welfare state, inter-class solidarity – barely changed, the economy that paradigm ruled was revolutionised.

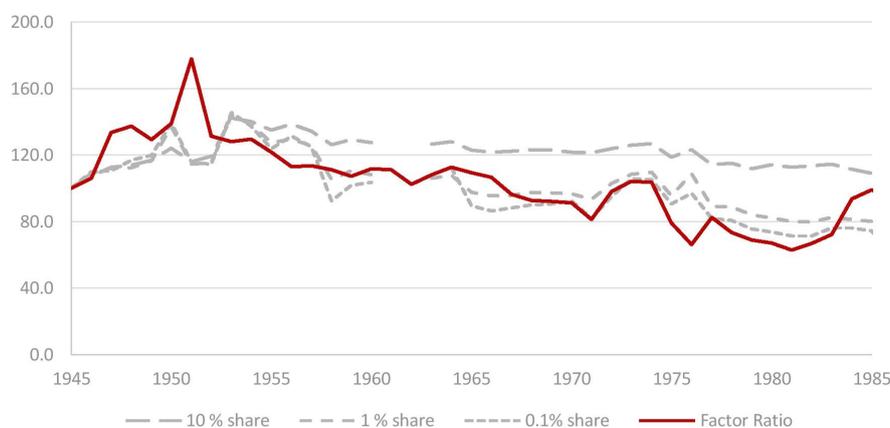


FIGURE 2. Indexed inequality and the factor ratio in the post-war economy.

The First National Government was elected in 1949 after fourteen years in opposition. The Labour Government before them had governed through the closing years of the Depression and the Second World War, rapidly developing the new political paradigm. Through the rapid expansion of direct transfers and subsidised healthcare Labour constructed the modern welfare state (McAloon, 2013, p. 45). By nationalising the Reserve Bank into political control and developing a substantial public works programme Labour developed an interventionist macroeconomic policy (McAloon, 2013, pp. 42-43 45). Labour made union membership compulsory for workers covered by the Court of Arbitration. Following a sudden drop in exports in 1938 Labour also required all imports to be licensed (McAloon, 2013, p. 45).¹¹ National's ascent into power required them to accept this new political paradigm, thus forming the post-war consensus (McAloon, 2013, p. 77).

¹¹Like much of the trade restrictions of the 20th Century this was more to do with wanting to control the balance of payments than it was to do with protectionism; exporters similarly required a government license.

The post-war consensus was built on to a shared sense of national interest. This can be seen in the peaceful industrial relations. Unions were mostly conservative, satisfied to pursue higher wages through arbitration and back-room negotiation (McAloon, 2013, p. 87). They accepted wage restraint as macroeconomically prudent. The singular event of militancy – the 1951 waterfront strikes which lasted from February to July – was opposed by the Federation of Labour, the dominant collective of unions (Ministry for Culture and Heritage, 2014). Union membership remained fairly constant at close to 40% of the workforce (Statistics New Zealand, 2004a, Industrial relations).

A deeper stress in the post-war consensus was the pivotal role of exporters in economic development. In the early 1950s, Britain purchased 66% of New Zealand's exports and over 80% of New Zealand's exports were agricultural (wool, meat and dairy) (Statistics New Zealand, 2004a, Merchandise exports). New Zealand was still a colonial economy. Leaders of the time were aware of the fragility of the situation: the reliance on a few commodities left New Zealand prone to price shocks, and the long-term prospects for an economy built on primary produce were few (McAloon, 2013, p. 110). These worries intensified during Britain's long courting of the European Community. Further, until 1985 New Zealand's exchange rate was fixed (first through Bretton Woods, then in the Sterling Area, then to a trade-weighted index). This led to balance of payments crises in 1938, 1952, 1957, 1961, 1966, 1975 and finally in 1984 (McAloon, 2013, pp. 45, 89, 105-107, 109, 126, 155-157, 200). Without an independent monetary policy, forced increases in net exports were often the only recourse. Thus for the sakes of both long term economic development and macroeconomic fine-tuning, producers were favoured with export subsidies (McAloon, 2013, p. 153), currency devaluations (McAloon, 2013, pp. 131, 153 - 157) and import substitution. This trend was not without opposition – the currency was revalued in 1973 and National had planned to phase out import licensing out from the mid-seventies before losing office (McAloon, 2013, pp. 152, 153). However the regularity of crisis and disagreements between successive governments denied the liberalisation programme any sustenance.

In 1968, the Arbitration Court took the balance of payments into account when setting a general wage order (McAloon, 2013, p. 135)). This set the precedent for 'incomes policy': government control over wage rates for macroeconomic objectives. Despite ideological hesitations from both the somewhat pro-market National Party and the somewhat pro-labour Labour party, both parties relied on incomes policies to constrain wages they saw as inflationary (McAloon, 2013, pp. 139, 155-156). This culminated in the government led by Robert Muldoon (neither particularly pro-market nor pro-labour) freezing prices and wages from 1982 to 1983 (McAloon, 2013, p. 188).

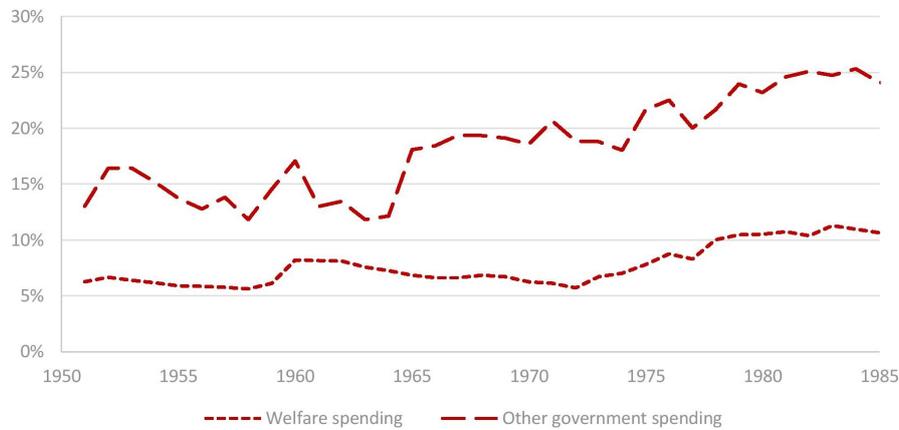


FIGURE 3. Post-war government spending as a share of GDP.
Source: [Statistics New Zealand \(2004a\)](#).

The welfare state was constructed in the late 1930s. Thirty years later the McCarthy Commission was established to review it ([McTaggart, 2005](#); [McAloon, 2013](#), p. 147). Its recommendations were implemented in full in 1972, initiating the largest expansion of welfare spending since the War. As discussed in Section 2 and at the end of Section 3, our measure of income inequality includes transfers as income and so an expansion of the welfare state should directly reduce the share of income taken by the wealthy, though our econometric specification did not find this. An expansion of the welfare state could also decrease the factor ratio by increasing the bargaining power of workers, further decreasing inequality.

Other government spending increased over a similar period. The government increased spending from \$635m to over \$1b in the three years from 1964 ([Statistics New Zealand, 2004a](#)). This included new spending on public works ([McAloon, 2013](#), p. 124), potentially increasing the demand for labour and thus raising wages. Significant public works would continue under the Muldoon Government's 'Think Big' programme of the late 1970s and early 1980s. Repeating the AR(1)-robust simple OLS estimation from Section 3 suggests that an extra percentage point of non-welfare government spending decreases the 0.1% share by 0.06 percentage points, the 1% share by 0.14 percentage points and the 10% share by 0.32 percentage points.¹² These respectively decrease to 0.04, 0.003 and 0.24 when the factor ratio is controlled for.¹³ While government spending may well be endogenous to inequality, that it is a less important determinant of inequality when the factor

¹²The respective standard errors are 0.012, 0.095 and 0.107 making the first and third results significant.

¹³The standard errors are now 0.014, 0.071 and 0.116.

ratio is controlled for suggests that it does reduce inequality by reducing the factor ratio.

For 29 of the 35 years beginning 1949 the National Party governed. While they had their differences with the short-lived Labour governments, the direction the two parties wanted to take New Zealand was very similar. Policy was formulated in the interests of the nation with a blindness to class. Growth was led by exporters who deserved their government's support. Wages were constrained, by decree if necessary. Given this political dynamic, the sharp reduction in income inequality cannot be attributed to any conscious industrial or social policy. While the growth in government spending and a corresponding increase in the factor ratio is part of the explanation, much of the change is likely more structural. As we noted above, in 1952 wool, meat and dairy accounted for 80.1% of New Zealand's exports ([Statistics New Zealand, 2004a](#), Central Government Expenditure). By 1985 this had shrunk to 47%. We might have expected that the diversification and development of the New Zealand economy would have increased the power of skilled labour, thus increasing inequality. This was not observed. The decline in agriculture may have reduced the profits taken by land-owners, thus decreasing the returns of capital. Again constructing AR(1)-robust OLS estimates an extra percentage point increase in the agricultural sector increases the 0.1% share of national output significantly, by 0.048 percentage points (the standard error is 0.0078). The 1% and 10% shares are not significantly affected. This estimate decreases only slightly when controlling for the factor ratio (to 0.037 with a standard error 0.010) suggesting agriculture affects inequality primarily through the rent distribution.

The post-war period witnessed fundamental changes to the New Zealand economy, even if the political paradigm those changes occurred within itself changed little. The lack of policy change means we lack obvious shocks which would allow us to attribute changing income inequality to either the factor ratio, to wage inequality or to rent inequality, though our analysis of government spending does suggest the factor ratio played some sort of important role. In sum, the economy changed, inequality changing with it. The mechanism through which that occurred remains largely unclear.

4.2. 1984 to 2011: government shows its muscle. Governments had a much clearer impact on income inequality after 1984. The Fourth Labour Government was elected amidst (yet another) balance of payments crisis. The government deficit was high and the economy was highly regulated. The new government rapidly reconstructed the state. The dollar was floated in 1985 ([McAloon, 2013](#), p. 203) and the Reserve Bank was given political independence and a strict inflation target in 1989. Inflation sat at about 5% and was reduced to 1% by 1992 ([Statistics New Zealand, 2004a](#), Consumers Price Index). The State Owned Enterprises Act of

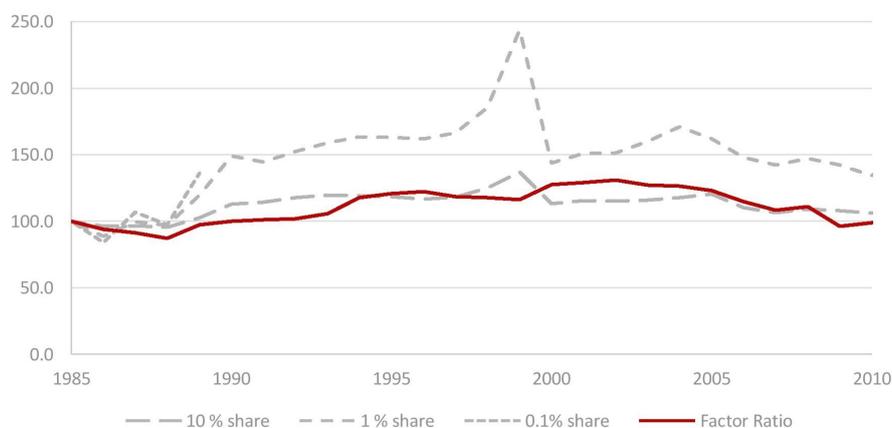


FIGURE 4. Indexed inequality and the factor ratio in the modern economy.

1986 introduced a corporate model for state production (McAloon, 2013, p. 204). Many of the new State Owned Enterprises were later sold. Agricultural and forestry subsidies were mostly removed in 1984 (McAloon, 2013, p. 202). Total subsidies were 2.3% of GDP in 1983, they were 0.5% in 1987.¹⁴ Tariffs composed 8.7% of tax revenue in 1985, in 1989 they were 2.3% (Statistics New Zealand, 2004a, Central government revenue).

The deregulation of financial markets deserves special attention. Between 1984 and 1986, interest rate controls were removed, the restrictions on new financial institutions were reduced, capital flows were unblocked and security markets were deregulated (Abiada, Detragiache and Tressel, 2008). These reforms were implemented more quickly than has been done in any other country. The role of the financial sector in a modern economy is complex and thus the impact of financial reforms on income inequality is unclear. Financial reforms might reduce inequality by allowing all capitalists to get a reasonable return on their capital.¹⁵ Financial reforms might increase inequality by increasing the returns on capital, thus increasing the factor ratio. As Christopoulos and McAdam (2014) discuss, testing this formally is difficult as financial reforms are rarely reversed and are likely endogenous to the inequality present at the time. Nonetheless the New Zealand experience suggests that financial reforms increase inequality – the 1% and 0.1% shares grew rapidly from 1986. This is important for our analysis as it demonstrates that the factor

¹⁴GDP(I) data taken from Statistics NZ's Infoshare tool.

¹⁵Financial reforms may remove increasing returns from capital by removing fixed costs or by making good investments easier to find. This will reduce the incomes of richer capitalists relative to poorer ones.

ratio has a real impact on inequality, even when counteracted by the distribution of rents becomes more equal.

Labour's history as a leftist party was still obvious in their approach to industrial relations and welfare. The 1987 Labour Relations Act broadened the areas unions could negotiate with employers (for example over the adoption of new technology), legalised striking and reformed the arbitration court to weaken government's role in dictating employment agreements (Geare, 1989, 213). Benefits were raised in 1984, 1987 and 1989 (McTaggart, 2005). These policies were forgotten after a National government was elected in the end of 1990 and marched the reformist fervour through to the labour market. The Employment Contracts Act voluntarised unions and removed many of their legal prerogatives (Morrison, 1996). Some benefits were abolished, others were cut by between 13% and 25%, and eligibility was restricted (McAloon, 2013, p. 210). This corresponded to over \$1 billion in reduced spending.

While the 10% share of income was steady through the 1990s, the 1% share continued to increase, probably in response to the labour market reforms. This suggests that those reforms did not increase wage inequality (which the 10% share largely captures), but rather increased income inequality by reducing the overall power of labour. This is corroborated by the increase in the factor ratio over the same period. Unfortunately our 0.1% series ends in 1989, but as we know that it is even more sensitive to the factor ratio than the 1% share, we would expect that this would have increased disproportionately. As we mentioned in Section 2, Statistics New Zealand quintile ratio data is available for this period. Their 80/20 ratio only increased from 2.42 in 1990 to 2.59 in 1998 (Statistics New Zealand, 2014a, BHC series). This again suggests that wage inequality did not increase and that the increase in income inequality was driven by the factor ratio.

Reform slowed after the National government nearly lost the 1993 election. The Labour government elected in 1999 considered inequality as key issue – they note in their manifesto that they would be an "an active government committed to reducing inequalities" (McCluskey, 2008). This was particularly obvious in their rhetoric about inequality between ethnic groups (Clark, 2000). Labour increased tax rates and minimum wages, moderated the Employment Contracts Act, and introduced a series of tax credits aimed at low-middle income families (Skilling, 2010). It developed more state assets – it created a state-owned bank, nationalised the railways, purchased a majority share in the national airline (Aimer, 2010, p. 476) and created a sovereign wealth fund (NZ Super Fund, 2014). This was no return to the post-war paradigm; it was an attempt to moderate the new paradigm's reforms. This moderation has continued into the National government elected in 2008.

Our data demonstrates this moderation. From the mid-1990s there is no upward trend in inequality or the factor ratio, and both have declined since 2000. [Atkinson and Leigh \(2007\)](#) suggest that the spike in 1999 corresponds to large dividend payouts in expectation of the election of the Labour government and the tax-increases they signalled. While it corresponds to a real increase in inequality in that year, it does not reflect any structural change.)

Governments from 1984 had a much more obvious impact on wages and rents and this provides us with a much greater ability to understand whether inequality is driven by the factor ratio. The financial reforms of the mid-1980s and the labour market reforms of the early 1990s both suggest that it is. While wage and rent inequality no doubt both changed significantly, our income shares – particularly the 1% share – appear driven by the factor ratio. The quite dramatic changes in income inequality over the twentieth century can be attributed to the changing power of capital and labour.

5. CONCLUSION

The struggle between capital and labour still matters. Our econometrics have found that the factor ratio can explain New Zealand's shifting experience of income inequality, particularly for inequality at the extremes of distribution. Our history has corroborated this – though much of the inequality is the result of complex processes which affect both inequality in rents and wages and the factor ratio, specific policies like the post-war rise in government spending, the financial reforms of the 1980s and the labour market reforms of the 1990s all suggest that the factor ratio matters. If policy-makers are to take income inequality seriously they will have to confront the relationship between capital and labour.

With the model of the factor ratio derived in [Krawczyk and Townsend \(2015\)](#), they can do that. That model derives the factor ratio and demonstrates how it is affected by changes to the tax system. In a future paper we will use viability theory to analyse the trade-offs involved in constraining the factor ratio with the tax system.

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