Do Tertiary Education Studies Still Pay Off in New Zealand? Gender and Sectoral Dynamics

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Abstract

This paper examines the changing economic returns to tertiary education in New Zealand from 2009 to 2024. Using data from the Household Labour Force Survey (HLFS), it uses log-linear and quantile regression specifications to examine changes over two separate windows: an extended window of 2009-2024 to observe structural change and a more finely grained window of 2016-2024 that allows disaggregation by qualification level—postgraduate, bachelor, and certificate levels. These patterns are described in the context of major labour market shocks such as the Global Financial Crisis and the COVID-19 pandemic.

This study finds a widespread decline in the wage premiums received for tertiary education in New Zealand, particularly in the post-COVID era. Although returns to postgraduate qualifications remain higher than to bachelor degrees, both declined somewhat. Outcomes for certificate-level qualifications are more variable: returns remain strong in traditionally high-paying industries for certificate holders, such as Mining, Electricity, and Health Care, but are much weaker in sectors like Retail and Education. Gender differences in the returns to education persist, narrowing at the lower end of the pay distribution but remaining wide at the upper end.

The findings suggest that the value of a qualification today increasingly depends on the type of credential and the industry in which it is applied.

Keywords: Higher Education, Economic Returns, New Zealand, Wage Gaps, Labour Market

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1 Introduction

Tertiary education—understood in this paper as comprising both higher education (bachelor and postgraduate degrees, NZQF Levels 7–10) and vocational training (certificate and diploma qualifications, typically NZQF Levels 4–6)—has long been a gateway to more and better-paid work and higher incomes. It is often assumed to be synonymous with opportunity and progress—a belief that has shaped individual choice and governmental policy (Psacharopoulos and Patrinos, 2018; Zuccollo et al., 2013). However, that assumption has come under growing scrutiny in recent years. New Zealand has seen mounting concerns over inflation, declining enrolment, and underemployed graduates, rekindling a critical question: *Is tertiary still worth it?* (Scott and Ali, 2024; Sutherland and Marshall, 2023; Ministry of Education, 2024).

Evidence shows that individuals with tertiary education have higher earnings than those with secondary education only (Hyslop et al., 2020; Zuccollo et al., 2013). However, with the labour market being reshaped by automation, digitalisation, and changing industry demands, these benefits appear less certain than they used to be (Acemoglu and Restrepo, 2020; Hyslop et al., 2020; OECD, 2024).

Technological change—specifically, artificial intelligence innovation—is disrupting many industries. Generative AI is taking over more cognitive tasks, making employers more focused on practical competencies and job-ready knowledge instead of academic qualifications (Komp-Leukkunen, 2024; Gupta and Kaushik, 2024; Adel et al., 2024). For especially rapidly evolving fields, a college degree may no longer yield the same return that it once did.

Meanwhile, concerns about talent loss are on the rise. Growing numbers of New Zealand graduates are going overseas—mainly to Australia—in search of better opportunities. Although brain drain has been a long-standing concern, recent data suggest that the issue may be intensifying. Surveys have indicated that nearly one in three new university graduates intend to leave the country upon graduation (NZ Herald, 2024; University of Auckland, 2024). This trend poses a risk to New Zealand's ability to compete globally and retain skilled workers.

In parallel, domestic enrolments in tertiary education have gradually declined since 2012, mainly due to falling numbers in certificate-level programmes (NZQF Levels 4–6) (Ministry of Education, 2024). While bachelor's enrolments have remained relatively

stable, vocational pathways have weakened. A brief uptick in 2021 was likely driven by temporary COVID-19 policy interventions, including the Targeted Training and Apprenticeship Fund (TTAF), which waived fees for selected subdegree programmes, and the Apprenticeship Boost Initiative, which subsidised employers to retain or hire apprentices (Tertiary Education Commission, 2020; Ministry of Social Development, 2020). Enrolments declined again in 2022 and 2023.

All of this makes it increasingly important to revisit the question of educational returns. The Global Financial Crisis and the COVID-19 pandemic brought large-scale changes to employment, skills demand, and the structure of work (Maré, 2022). Yet there is still limited research on how such shocks have shaped the value of higher education, especially across different qualification levels and industries.

This study shows that while higher education in New Zealand once offered consistent wage advantages, those benefits have grown increasingly heterogeneous. Since 2009, returns have varied not only by qualification level but also by industry. Using HLFS data, the study assesses whether tertiary education remains a sound investment—for individuals and for society—within a labour market shaped by disruption, recovery, and structural change.

Using HLFS data, this study explores how returns to tertiary education have evolved in a labour market shaped by disruption, recovery, and structural change—offering new evidence on the extent to which such education continues to yield economic advantages for individuals.

It analyses trends before and after the pandemic and disaggregates results by qualification type (postgraduate, bachelor's, certificate-level), sector, gender, and age. By combining log-linear and quantile regressions, the study uncovers average returns and how these vary across the income distribution—revealing patterns often hidden in aggregate analyses.

Preliminary findings show that postgraduate qualifications continue to yield substantial wage premiums, while returns to bachelor's and certificate-level credentials appear to be losing value in some sectors (Universities New Zealand, 2024). These results have practical relevance for students making career decisions, policymakers designing funding schemes, and institutions adjusting to labour market shifts and enrolment pressures.

This article contributes to the literature by presenting a detailed, post-pandemic por-

trait of the evolution of wage returns to tertiary education in New Zealand between 2009 and 2024. Drawing on HLFS data, it combines log-linear and quantile regression models to examine both average and distributional effects. The analysis provides stark disaggregation by sector, level of qualification, gender, and age—revealing rising heterogeneity in returns, sectoral restructuring, and recovery trajectories with a gendered effect. These findings have important policy implications for students planning their futures, institutions shaping programme offerings, and policymakers responding to shifts in the labour market and education system.

The structure of the paper is as follows. Section 2 explores the conceptual and empirical background. Section 3 explains the data and methods. The main results are shown in Section 4, followed by a discussion in Section 5 and conclusions in Section 6.

2 Literature Review and Conceptual Framework

2.1 Private and Social Returns to Tertiary Education

Private returns refer to the individual benefits of higher education, mainly in the labour market. For example, increased earnings, improved employability, or enhanced career advancement opportunities. Conversely, social returns are about societal benefits from a more educated population, such as improved public health, greater civic engagement, higher economic growth, or reduced inequality (Zuccollo et al., 2013; Smyth and Strathdee, 2010).

The private economic benefits of higher education in New Zealand have been extensively documented. Individuals with tertiary qualifications experience substantial wage premiums compared to those with only secondary education. While these wage premiums are somewhat lower than the OECD average, they remain significant, reflecting the positive individual returns to higher education investment (Zuccollo et al., 2013; Hyslop et al., 2020).

Studies show that degree holders exhibit higher lifetime earnings trajectories, with wage differentials widening over time as career advancement opportunities accrue (Mahoney, 2014; Park et al., 2014). Additionally, employment rates are consistently higher among tertiary-educated individuals, further enhancing their private returns (Scott and Ali, 2024).

However, private returns vary significantly across different dimensions. Factors such as degree level, field of study, gender, and ethnicity influence the magnitude of wage premiums and employment outcomes (Borland, 2000; Mahoney, 2014). For example, graduates from fields such as engineering and health sciences typically experience higher returns compared to those from arts or humanities (Scott, 2009). Moreover, Māori and Pasifika graduates often face lower median earnings compared to their European counterparts, reflecting persistent structural inequalities in the labor market (Mahoney, 2014).

Beyond the advantages it brings to individuals, higher education also benefits society meaningfully. For instance, it contributes to better public health—graduates generally experience better health outcomes and access medical services when needed (Mahoney, 2014; Scott and Ali, 2024). Education also nurtures civic engagement: people with higher levels of education tend to vote more, volunteer in their communities, and participate in public life to a greater extent—activities that reinforce social cohesion and democratic values (Zuccollo et al., 2013). Economically, a well-educated workforce drives productivity and fosters innovation. These are key drivers of long-term economic growth and resilience (Smyth and Strathdee, 2010; Hyslop et al., 2020).

Higher education also plays a crucial role in promoting social equity. By expanding access to education, societies can mitigate income inequalities and facilitate upward social mobility. Public investment in tertiary education, supported by policies such as interest-free student loans and grants, has been instrumental in promoting equitable access in New Zealand (Marshall, 2018; Sutherland and Marshall, 2023). Nevertheless, disparities remain, particularly in the distribution of returns across different socio-economic and ethnic groups.

In summary, the returns to higher education in New Zealand are diverse, encompassing both private economic and broader social benefits. This study focuses exclusively on individual economic returns, providing updated evidence and addressing an important gap in the literature, which has relied mainly on pre-pandemic data.

2.2 Methos for Measuring Educational Returns

Various methodological techniques have been devised to estimate the economic payoff to higher education. The Net Present Value (NPV) method is a conventional technique. NPV reconciles the present value of future income due to higher education minus the ex-

penses incurred in the study phase. This indicator has a clear benefit: it may be decomposed into separate elements, facilitating consideration of the costs and returns to higher education over the individual's lifecourse. While there are familiar limitations—especially regarding inaccuracy in specific input data—the NPV approach still ranks as the most commonly used technique for international analysis, including studies on New Zealand and other OECD nations (Zuccollo et al., 2013).

Another popular method deals with the estimation of wage premiums through regression analysis. These premiums represent the income benefit an individual receives in the form of higher wages due to tertiary education compared to individuals with only secondary or lower levels of education. It is the additional income attributed to pursuing higher education. In order to separate the impact of education on earnings from other determinants of income, wage premiums are usually estimated through multivariate regression models controlling for a range of individual and labour market variables, including age, gender, ethnicity, industry, and occupation (Borland, 2000; Scott and Ali, 2024). These models attempt to adjust for variables that might confound or bias the estimated returns.

These models also strive to adjust for selectivity biases and for unobserved variables that might bias estimated returns. While these approaches are informative, there are also methodological challenges. Endogeneity, unobserved heterogeneity, and selectivity bias can bias estimated returns. For example, individuals who attend university might differ systematically in a way that also influences potential earnings from individuals who do not. Fixed effects regression models and longitudinal data are also used to address some of these challenges and provide temporally more stable estimates (Maré and Liang, 2006; Mahoney, 2014).

Wage premiums are a widely used method for comparing how the value of education changes over time. By measuring how much more individuals with tertiary education earn than those with only secondary education, this approach helps track changes in the economic return to education across different cohorts and economic periods (e.g., pre- and post-COVID). However, wage premium estimates do not account for the direct and opportunity costs of obtaining a qualification. In contrast, Net Present Value (NPV) methods incorporate these costs, offering a more comprehensive assessment of the economic payoff to education. That said, NPV approaches typically require longer

time horizons and richer individual-level data to produce robust and credible estimates (Zuccollo et al., 2013; Borland, 2000).

Together, NPV analysis and regression-based estimates of wage premiums form the methodological foundation of most empirical research measuring the private and social returns to education. While these approaches have recognised limitations, they are fundamental to informing the value of educational investment and policy on the provision and finance of tertiary education (Zuccollo et al., 2013; Smyth and Strathdee, 2010).

2.3 Higher Education and Labour Market Context in New Zealand

2.3.1 Structure of the Higher Education System

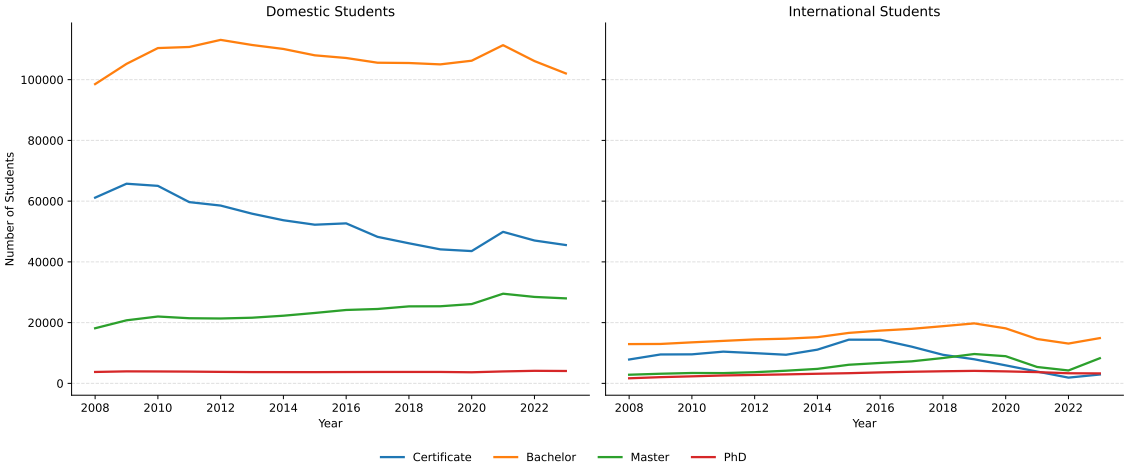
New Zealand's higher education system is broad and flexible, designed to support both academic and vocational learning routes. It includes eight public universities primarily research-oriented and mainly grant qualifications from bachelor's degrees to doctorates, although some institutions also offer sub-degree programmes. Te Pūkenga, established in 2020 through the merger of 16 Institutes of Technology and Polytechnics (ITPs), has provided vocational and applied education at certificate, diploma, and applied degree levels. However, in 2023, the Government announced its decision to disestablish Te Pūkenga and return to a model of regional decision-making for vocational education (Tertiary Education Commission, 2024). Wānanga offers education grounded in Māori traditions and knowledge systems. Private Training Establishments (PTEs) and Industry Training Organisations (ITOs) contribute further to the sector by offering work-based or industry-specific learning opportunities (Scott, 2009; Scott and Ali, 2024).

Qualifications in New Zealand are regulated by the New Zealand Qualifications Framework (NZQF), a comprehensive system consisting of 10 levels that range from foundation certificates at Level 1 to doctoral degrees at Level 10. Secondary school qualifications, such as the National Certificate of Educational Achievement (NCEA), are at Levels 1 to 3, typically completed by students in Years 11 to 13. Vocational education is generally delivered at Levels 4 to 6 and, in New Zealand, is classified as part of tertiary education because it is undertaken after secondary school and provided by tertiary institutions such as institutes of technology and polytechnics. University education is offered at Levels 7 to 10, encompassing bachelor's degrees through to doctoral qualifications (New Zealand

Qualifications Authority, 2022).

Figure 1 illustrates the evolution of full-time equivalent (FTE) enrolments in New Zealand's tertiary education system between 2008 and 2023, disaggregated by qualification level and student type (domestic and international). The data show that bachelor's degrees consistently attract the highest number of FTE students. Domestic enrolments in bachelor's and PhD programmes have remained relatively stable, while master's-level enrolments have gradually increased. Conversely, enrolments in certificate-level programmes have declined steadily. Among international students, FTE enrolments peaked between 2016 and 2017 but dropped significantly after 2020—especially in certificate and bachelor's qualifications. Although master's enrolments have shown signs of partial recovery post-pandemic, international numbers remain below pre-COVID levels.

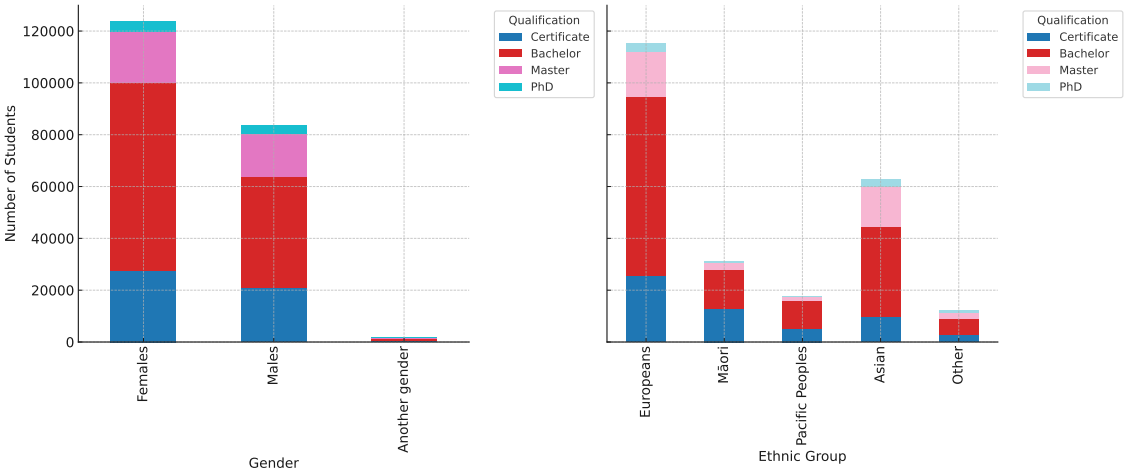
Figure 1: Full-time equivalent (FTE) enrolment in tertiary education by qualification level and student type, 2008–2023



Source: Author's elaboration based on Education Counts data.

Figure 2 presents the distribution of full-time equivalent (FTE) tertiary enrolments in 2023, disaggregated by gender and ethnicity across qualification levels. It shows that women represent the majority of tertiary students across all levels. Out of approximately 209,000 enrolments, 59% were women, 40% were men, and less than 1% identified as another gender. The largest gender gap was observed at the bachelor's level, where female students exceeded male students by nearly 30,000. In postgraduate studies, women also outnumbered men, while the gender gap is narrower in certificate-level programmes.

Figure 2: Composition of Tertiary Enrolments by Gender and Ethnicity, by Qualification Level (FTE, 2023)

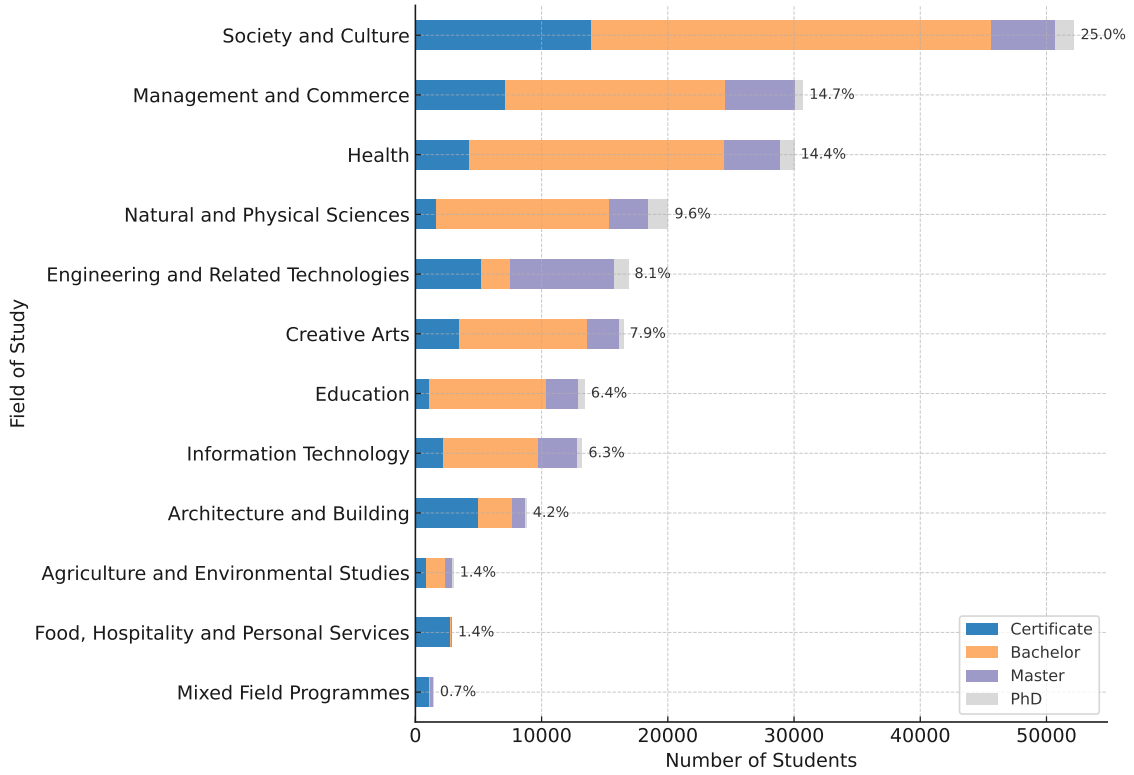


Source: Author's elaboration based on Education Counts data.

In terms of ethnicity, Europeans make up the majority of bachelor-level enrolments. While a substantial share of Māori students are also enrolled in bachelor's degrees, nearly 40% study at the certificate level, a much higher proportion than other ethnic groups. This pattern points to persistent differences in educational trajectories and access to advanced qualifications across ethnic communities.

Figure 3 shows the distribution of tertiary enrolments by broad field of study. More than half of the total FTE enrolments in 2023 were concentrated in three main areas: Society and Culture, Management and Commerce, and Health. These fields dominate tertiary education, especially at the bachelor and postgraduate levels.

Figure 3: Tertiary Enrolments by Field of Study and Qualification Level (FTE, 2023)



Source: Author's elaboration based on Education Counts data.

This pattern is consistent with previous analyses showing that while the overall share of enrolments in the humanities (e.g., Literature, Languages) has declined over the last decade, Society and Culture remains the largest category at degree level. However, its internal composition has shifted towards social sciences and applied areas such as law and psychology, while traditional humanities fields have lost ground (Smart, 2018).

The model of tertiary education in New Zealand involves a mixed public–private cost-sharing arrangement. Domestic students benefit from government subsidies, including publicly funded student loans and the Fees-Free scheme for first-year students. However, learners still contribute a significant share of the cost. In 2021, public funding accounted for 59% of tertiary education expenditure, below the OECD average of 68%. New Zealand belongs to a group of mainly Anglophone countries with relatively high tuition fees—among the top quarter of OECD countries—but also a comparatively large share of students receiving public financial support through loans or grants. Nearly three-quarters of domestic tertiary students receive some form of publicly supported student loan or allowance. Although the country spends a relatively high share of its GDP on education

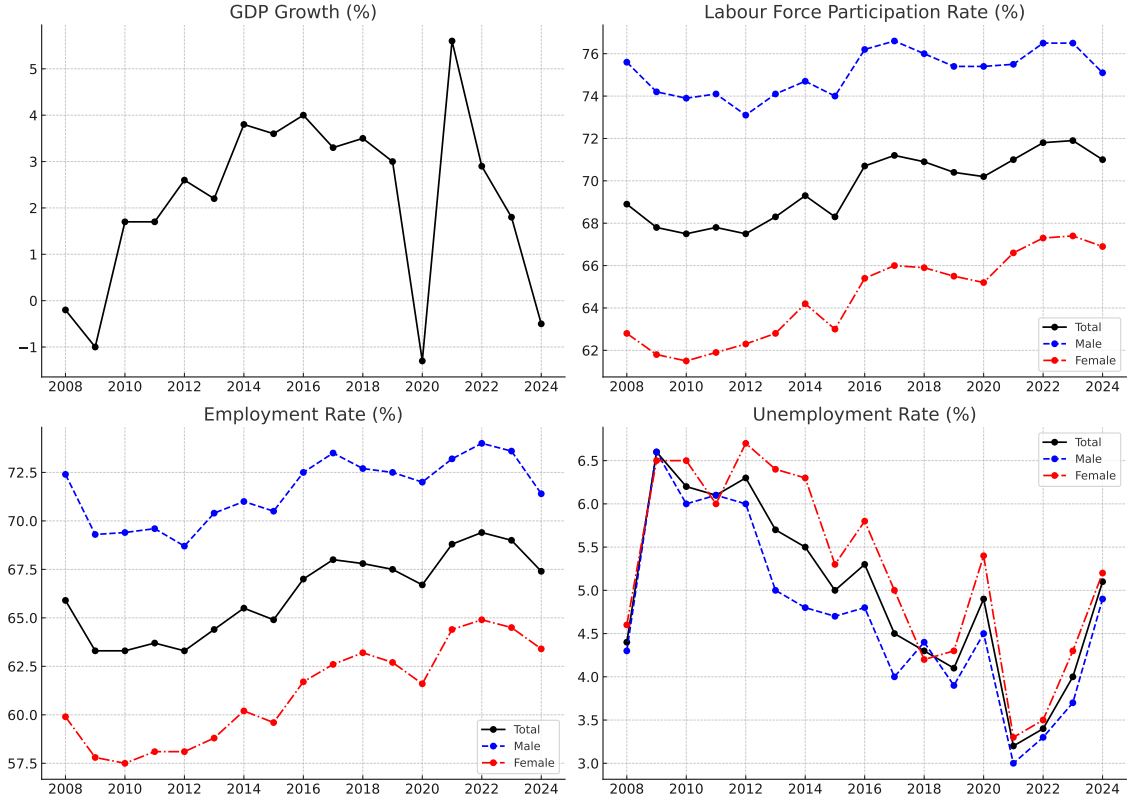
overall (5.3%), public expenditure per tertiary student sits slightly below the OECD average (Scott and Ali, 2024).

2.3.2 Evolution of the Labour Market (2008–2024)

The New Zealand labour market shifted considerably from 2008 to 2024 due to two global crises: the Global Financial Crisis (GFC) and the Covid pandemic. Alongside these shocks, changes in public policy, the composition of the labour force, and patterns of labour demand also played a role. To understand the transition, it is helpful to break the period into three main phases: the post-GFC recovery (2008–2013), a period of relatively inclusive growth (2014–2019), and the pandemic-induced changes characteristic of the early 2020s (2020–2024).

Figure 4 summarises the evolution of key labour market indicators in New Zealand between 2008 and 2024. It presents quarterly (Q4) trends in GDP growth, employment and unemployment rates, and labour force participation—disaggregated by sex when available. This contextualises the analyses discussed in this section.

Figure 4: Key labour market indicators in New Zealand, 2008–2024 (Q4 data): GDP growth, labour force participation rate, employment rate, and unemployment rate, by sex when applicable.



Source: Author's elaboration based on Stats NZ, seasonally adjusted series.

Global Financial Crisis and Recovery (2008–2013): The GFC's impact was deep but relatively contained in the New Zealand labour market compared to other OECD countries. As Maré (2022) observe, the unemployment rate rose from 3.8% to 6.7% between 2008 and 2010, with job losses concentrated among youth and low-skilled workers. Employment levels only returned to pre-crisis levels by 2013. Labour force participation remained relatively high, supported by counter-cyclical policies and ongoing migrant inflows that helped stabilise the economy. As is common during downturns, enrolments in tertiary education increased as individuals pursued further study to shield themselves from unfavourable job market conditions (OECD, 2014).

Inclusive Growth and Tightening of the Labour Market (2014–2019): From 2014 to 2019, New Zealand witnessed strong and inclusive economic growth. Employment grew strongly in most sectors, with unemployment declining to 4% by 2019—the lowest

level in over a decade (Maré, 2022). Modest rises in real wages and broad-based employment gains were observed across demographic groups. Labor force participation rates rose among women, older workers, and Māori. Education levels continued to rise, with a growing share of the workforce holding tertiary qualifications. Structural changes in labour demand, specifically to employment in the healthcare, education, and information technologies sectors, highlighted the increasing value of higher-level skills, as reflected in rising labour market premiums.

Pandemic Disruptions and Structural Transformation (2020–2024): New Zealand experienced a sharp economic contraction in the second quarter of 2020 due to the COVID-19 pandemic, with GDP falling by 10% compared to the previous quarter and rebounding by 14% in the third quarter (Stats NZ, 2020). This rapid recovery was supported by decisive public health interventions and an expansive fiscal and monetary policy mix, including a NZ$60 billion Large Scale Asset Purchase programme and wage subsidies to protect employment relationships (Hyslop et al., 2023; Reserve Bank of New Zealand, 2025). Over the following years, economic activity remained relatively strong, with GDP growing 2.7% in the second half of 2024 before showing signs of correction amid tighter monetary conditions (Reserve Bank of New Zealand, 2025). The pandemic also accelerated structural changes in the labour market. These included the widespread adoption of remote work, faster digitalisation, and prolonged disruption in face-to-face industries like tourism and retail. Additionally, demographic ageing and reduced net migration placed pressure on labour supply, particularly in high-skill sectors (Salter, 2023).

More widely, New Zealand's labour market has undergone a structural transformation and cyclical adjustment, intensifying the demand for higher-level skills (Salter, 2023). As digitalisation accelerated and new work practices emerged, relative rewards to tertiary education became more compelling—especially in an environment where digital literacy and technology-related skills were increasingly sought. These changes have led to more dynamic forms of employment, particularly in sectors shaped by digital transformation and flexible work arrangements.

2.3.3 Summary

The New Zealand labour market and higher education system have significantly changed in the last two decades. The tertiary sector has expanded and diversified, while the labour market has undergone crisis and recovery phases, inclusive growth, and structural transformation. As the aforementioned developments have remoulded the demand for high-level skills and impacted the individual and social returns to education, it is critical to identify these broader trends to understand how returns to education are transforming—particularly as technological changes, demographic pressures, and global disruptions further transform the nexus of tertiary education and work outcomes.

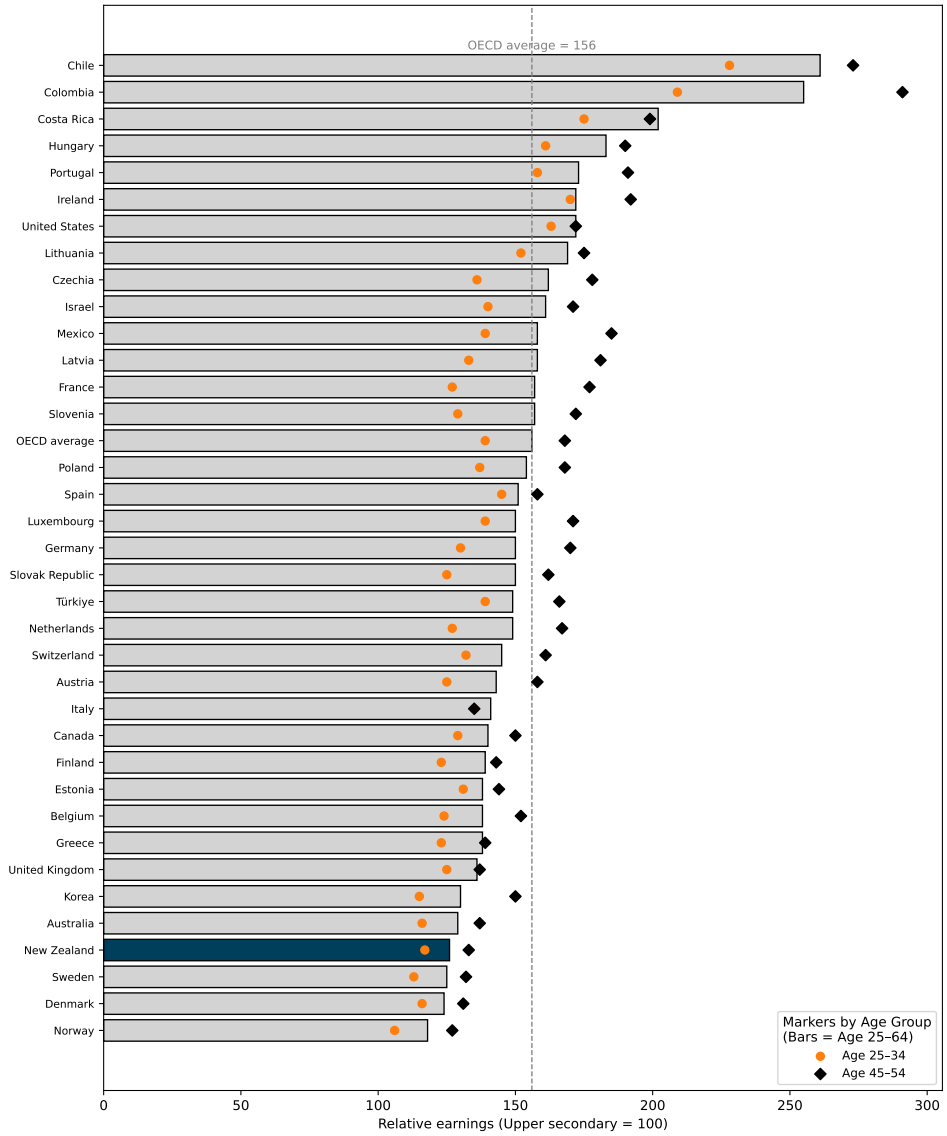
2.4 Empirical Evidence on Educational Returns in New Zealand

2.4.1 Trends in Wage Premiums and Earnings

Empirical data consistently supports broad wage premiums for higher education qualifications in New Zealand. On average, those with a bachelor's degree earn around 60% more than individuals without any formal qualification, while holders of a tertiary diploma earn approximately 30% more (Scott, 2009). Postgraduate qualifications generate even more substantial returns, offering wage premiums of about 75% compared to those without qualifications (Mahoney, 2014; Park et al., 2014).

Although the wage premium for tertiary education in New Zealand remains substantial, it is somewhat below the OECD average (OECD, 2024). Figure 5 displays relative earnings of workers with tertiary education compared to those with upper secondary attainment across OECD countries for the year 2022. New Zealand ranks among the lowest in relative earnings for tertiary-educated workers in all age groups (25–34, 45–54, and 25–64), underscoring the modest financial returns to higher education in the New Zealand context.

Figure 5: Relative earnings of tertiary-educated workers compared to those with upper secondary education in OECD countries (2022), disaggregated by age group (25–34, 45–54, and 25–64)



Source: Author's elaboration based on OECD (2024), *Education at a Glance 2024*, Table A4.1.

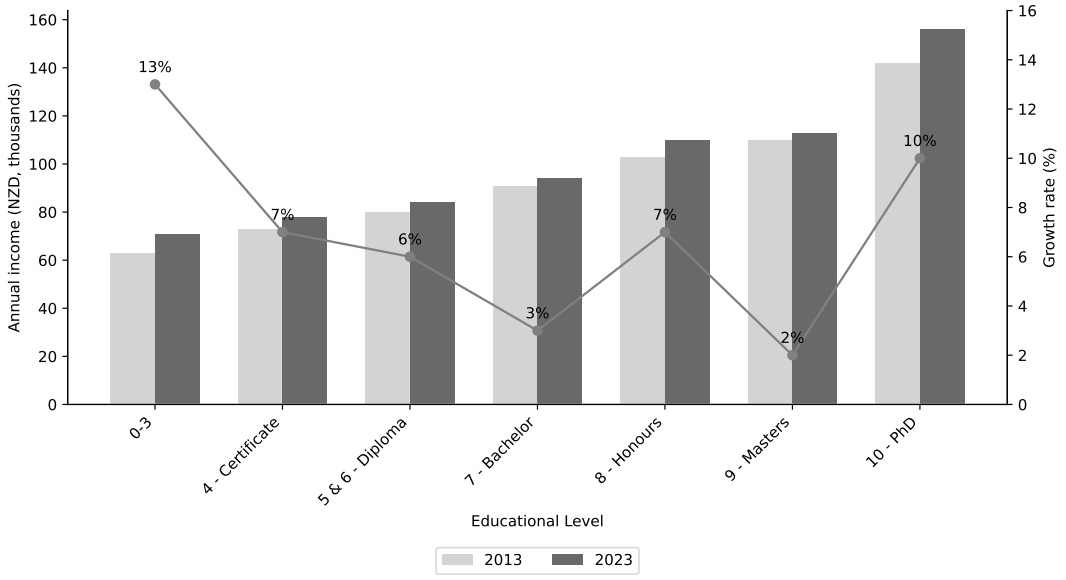
Previous evidence suggests that this is partly due to the relatively strong employment rates and earnings among those with only secondary education in the country (Zuccollo et al., 2013). Even so, individuals with degrees tend to follow steeper earnings paths throughout their careers, with wage gaps widening progressively as professional experience and advancement accumulate (Mahoney, 2014).

More recent findings indicate that the returns to qualifications and skills have continued to be positive in New Zealand's labour market. Still, issues such as slower earnings

growth among younger generations and rising labour market polarisation have emerged (Hyslop et al., 2020). It is also worth noting that most of the existing data predates the COVID-19 pandemic.

New data from the 2023 Census, analyzed by Universities New Zealand using linked earnings information from Inland Revenue, show that while tertiary graduates continue to earn significantly more than those with lower-level qualifications, the real wage growth associated with tertiary education has generally been modest over the past decade (comparing 2013 and 2023) (Universities New Zealand, 2024). Figure 6 presents gross annual earnings by highest qualification level, adjusted to 2023 prices. The chart reveals that Level 7 bachelor-degree holders experienced lower real income growth than even certificate and diploma holders, highlighting the stagnation in returns to bachelor's-level qualifications. In contrast, Level 10 PhD holders recorded the highest real income growth over the decade.

Figure 6: Real growth in annual earnings by educational level, comparing 2013 and 2023 (amounts in 2023 NZD).



Source:

Author's elaboration based on Census data analyzed by Universities New Zealand.

Despite its value, the Census data has key limitations. It does not allow for calculating hourly wages or net income, relying instead on gross annual earnings. Moreover, the analysis provided by Universities New Zealand is purely descriptive and does not include controls for individual or job-related characteristics.

2.4.2 Heterogeneity in Educational Returns

Though higher-level tertiary qualifications generally have positive economic returns in New Zealand, there is much heterogeneity by field of study, degree level, and demographic groups. These differences are significant in recognizing the multifaceted impacts of tertiary education and building policies that deliver equitable outcomes.

The field of study is a key source of heterogeneity. Graduates in engineering, information technology, health sciences, and law receive better pay than graduates in the creative arts, humanities, or hospitality fields (Scott, 2009; Mahoney, 2014). Data from the 2023 Census also confirm that medicine, dentistry, and engineering graduates possess some of the best median incomes at all qualification levels, while incomes in the communications and media, or creative arts fields, are comparatively low (Universities New Zealand, 2024).

Demographic disparities further highlight these differences. Despite attaining tertiary qualifications, Pasifika and Māori graduates have lower median earnings than their European counterparts (Mahoney, 2014). Gender-based disparities also persist, with women earning less than men across most fields of study and qualification levels. However, these gender gaps tend to narrow among those with postgraduate degrees (Scott and Ali, 2024).

These disparities reflect structural effects in New Zealand's labour market. Research shows that Māori and Pacific graduates, even when similarly qualified, are underrepresented in higher-paying academic and professional roles and face systemic barriers to promotion and pay equity—indicative of institutional discrimination and labour market segmentation (McAllister et al., 2020; Theodore et al., 2018).

Moreover, gender disparities in earnings persist across qualification levels. Although tertiary education improves earnings for both men and women, men consistently earn more on average. These gaps are particularly marked at the bachelor's and postgraduate levels and are shaped by differences in field of study, rates of progression to postgraduate study, and occupational segregation (Mahoney, 2014; Scott and Ali, 2024).

[Note for review: A graph showing gender wage disparities by qualification level will be included in the next version.]

2.4.3 Public Benefits of Higher Education

Aside from the individual financial benefits to people, higher education generates substantial public good that accrues to society at large. The social paybacks include improved health, civic participation, enhanced economic productivity, and social equity promotion.

Graduates have better health outcomes than non-graduates through healthier lifestyles and increased access to healthcare services. Enhanced education is associated with higher health knowledge and improved working conditions with, in most instances, health insurance and other benefits supplied by the employer (Mahoney, 2014; Scott and Ali, 2024). For example, studies show that education strengthens individuals' abilities to access health care, participate in healthy living, and navigate complex medical systems (Stephens et al., 2022; Dulin et al., 2011). These effects reduce public health system costs and allow extended and more productive working lives.

It also encourages more engaged civic participation. Citizens with tertiary education are likelier to engage in democratic activities, volunteering, and community organizations (Zuccollo et al., 2013). For Māori and Pacific students, tertiary institutions can play an important role in supporting cultural identity and maintaining community bonds, especially when indigenous knowledge systems are embedded in educational practices. Programs centered on these knowledge systems have been found to foster a sense of belonging among students, as well as their civic engagement (Brownie et al., 2024; Oetzel et al., 2024). Greater participation contributes to social cohesion and builds more cohesive societies.

From an economic perspective, an educated labour force makes a nation more productive and capable of innovation. Tertiary education enhances employees' cognitive and technical capacity to produce more efficiently and at a higher order of production and to be more responsive to technological change (Hyslop et al., 2020; Smyth and Strathdee, 2010). Firms and the economy are likely to gain through higher productivity growth in industries with a greater proportion of tertiary-educated workers.

Besides, tertiary education fosters a culture of lifelong learning. Tertiary graduates will be more likely to have ongoing upskilling and further education throughout their lifetime, improving workforce adaptability and resistance to technological and economic shocks (Hyslop et al., 2020).

Tertiary education plays an important role in reducing income inequality. By opening

up opportunities in high-skilled jobs, tertiary education increases social mobility and reduces economic inequality between socio-economic groups (Marshall, 2018; Sutherland and Marshall, 2023). Government subsidies, including student loan schemes, allowances, and the Fees-Free policy, have contributed to broadening access to tertiary education for students from diverse socio-economic backgrounds (Scott and Ali, 2024).

Overall, the public worth of tertiary education extends well beyond individual financial benefits in justifying its place as a leading driver of health, civic participation, economic development, and social cohesion in New Zealand.

2.5 International Perspectives

2.5.1 Comparative Trends Across OECD Countries

New Zealand's higher education system and the associated economic returns exhibit distinct features when compared to other OECD countries. Historically, the private financial returns to tertiary education—both in terms of Net Present Value (NPV) and wage premiums—have been relatively modest in New Zealand compared to OECD averages (Zuccollo et al., 2013; OECD, 2024). Several global trends shape this comparative landscape.

Across OECD countries, participation in higher education generally leads to significant increases in earnings and employment rates. Nevertheless, New Zealand's wage premiums for tertiary education are lower than those observed in countries such as the United States or the United Kingdom (Zuccollo et al., 2013). Despite this, New Zealand maintains high employment rates across all education levels, contributing to relatively stable income outcomes even for those without tertiary qualifications (Scott and Ali, 2024).

Recent data reinforce these patterns. According to OECD (2024), the earnings premium for bachelor's degree holders relative to upper-secondary graduates in New Zealand is lower than the OECD average. While tertiary graduates do earn more, the income gap is narrower, reflecting broader labor market inclusiveness. High levels of employment among non-degree holders and a compressed wage structure are key features that differentiate New Zealand's returns to education from those of other developed economies.

Moreover, the composition of tertiary qualifications matters. New Zealand has a comparatively high share of sub-degree qualifications, such as diplomas and certificates, which typically yield lower private returns compared to university degrees (Zuccollo et al.,

2013). This mix influences aggregate returns when comparing across countries where bachelor's and postgraduate qualifications dominate tertiary completion rates.

2.5.2 Factors Explaining Cross-Country Differences

Various factors explain New Zealand's relatively low private returns to higher education.

First, economic fundamentals influence the level of earnings inequality. New Zealand has one of the highest minimum wages in the OECD relative to median earnings, and union density is low (Scott and Ali, 2024). While low unionisation is often associated with greater wage dispersion, in the case of New Zealand, the combination of a high minimum wage and a compressed wage structure helps contain income inequality. This, in turn, narrows earnings differentials across education levels and reduces the observed private returns to tertiary education (Zuccollo et al., 2013).

Countries with more unequal wage distributions—such as the United States and the United Kingdom—tend to show higher private returns to higher education. Conversely, countries with compressed wage structures and strong labour market institutions—such as the Nordic countries and New Zealand—tend to exhibit lower private returns despite high employment rates across education levels (OECD, 2024; Psacharopoulos and Patrinos, 2018; Machin, 2011).

Second, the composition of tertiary qualifications also matters. New Zealand's education system places considerable emphasis on applied and vocational training, with many students gaining sub-degree qualifications. While this model supports high employment rates at all levels, it generates lower average wage premia compared to systems where bachelor's and postgraduate degrees are more prevalent (Zuccollo et al., 2013).

Third, labour market inclusiveness further flattens wage differentials. Employment rates for persons with secondary education or below are comparatively high in New Zealand, diminishing the relative benefit of pursuing tertiary education solely for job security (Scott and Ali, 2024). In comparison, the reward for tertiary education is higher in countries with segmented labour markets.

Fourth, migration patterns are also relevant. New Zealand's labour force comprises many immigrants, whose qualifications are not always transferable to similar labour market outcomes. This has the effect of depressing aggregate wage returns to tertiary qualifications (Scott and Ali, 2024).

Fifth, progressive tax rates and significant government subsidies for tertiary education redistribute part of the economic return from the individual to society. While this enhances social equity, it also reduces the private financial incentive commonly linked to investment in higher education (Marshall, 2018).

2.6 Summary and Research Gaps

This chapter has reviewed the contextual background, empirical trends, and international comparisons related to the economic returns of tertiary education in New Zealand. The evidence confirms that higher education yields meaningful benefits for individuals and society. However, these benefits are unevenly distributed—they vary by qualification level, field of study, gender, ethnicity, and sector. Compared to other OECD countries, New Zealand shows positive but comparatively modest private returns shaped by structural factors such as high minimum wages, a compressed wage distribution, and strong employment outcomes, even among those without tertiary credentials.

Despite this broad consensus, several important research gaps remain. First, much of the existing literature is based on pre-2020 data, which limits our understanding of how major disruptions—such as the COVID-19 pandemic and accelerated digitalisation—have affected the value of tertiary qualifications. Second, most studies do not adopt a longitudinal perspective, making observing how returns evolve across a person's working life or in response to economic shocks challenging. Third, there is limited evidence on how returns vary across qualification levels—particularly for certificate-level programmes, which are often omitted or aggregated in existing analyses. Similarly, comparative dynamics between bachelor's and postgraduate qualifications are rarely examined, obscuring substitution patterns and differential valuation in the labour market.

Fourth, studies often focus on average wage outcomes without capturing distributional dynamics. This neglects critical phenomena such as the "glass ceiling" or "sticky floor" effects, which may affect different groups unequally. In particular, there is a lack of research using quantile regressions to explore how educational returns differ across the earnings distribution for men and women or ethnic subgroups. Fifth, while some literature explores gender gaps, it tends to do so in aggregate terms and rarely disaggregates results by sector or industry—limiting our understanding of intersectional inequalities. Finally, there is a strong bias in the literature toward measuring educational success in

purely monetary terms. Non-pecuniary outcomes—such as job satisfaction, career progression, and employment stability—are often overlooked despite their importance for understanding the full impact of tertiary education.

This study contributes to filling several of these gaps. It offers one of the first comprehensive post-pandemic analyses of wage returns to tertiary education in New Zealand, extending the evidence base through 2024. It uses a long-run series (2009–2024) to identify broad trends and structural shifts, including the effects of major economic disruptions. It also introduces granular, disaggregated estimates by qualification level (including certificates), industry sector, gender, and age. The use of quantile regressions allows for an examination of heterogeneity across the wage distribution—highlighting dynamics that are hidden in mean-based models. This methodological approach sheds light on who benefits most from higher education, in what contexts, and under what conditions.

By identifying persistent disparities and new structural trends, this paper offers a richer, more nuanced account of how tertiary education affects labour market outcomes in New Zealand. It also provides a foundation for future research to build on, including studies incorporating qualitative and longitudinal data to refine our understanding of educational returns in a changing economy further.

3 Methodology

3.1 Data Sources and Sample Construction

This research uses microdata from Stats NZ's Household Labour Force Survey (HLFS), accessed via the Integrated Data Infrastructure (IDI) (Stats NZ, 2025, 2016). Since the HLFS changed the way it measured highest educational attainment after the 2015 survey, the analysis is divided into two sub-periods—2009 to 2024 and 2016 to 2024—to ensure internal consistency (Stats NZ, 2016). The sample includes working-age adults aged 25 to 64 who receive wages or salaries.

Unlike OECD's *Education at a Glance* (OECD, 2024), which typically reports outcomes for full-time workers only, this study includes both full-time and part-time employees. This approach better reflects the structure of New Zealand's labour market, where part-time work is widespread.

For the analysis spanning 2009–2024, this study consistently compares secondary ed-

ucation against higher education attainment. However, due to limitations in the HLFS questionnaire design and coding framework prior to the 2016 redevelopment, the earlier segment of the analysis (2009–2015) aggregates bachelor's, master's, and PhD degrees into a single "tertiary" category. This grouping responds to two key issues. First, certificate-level qualifications were not distinctly captured in the HLFS before 2016. Second, the small number of observations for postgraduate qualifications—particularly PhDs—produced erratic year-to-year fluctuations. These were exacerbated by changes in how educational qualifications were recorded across survey waves. As a result, combining these higher education levels into a single category provides more stable estimates and improves comparability across years.

The 2016 redevelopment introduced a redesigned questionnaire and updated coding practices that improved data collection on post-school qualifications, including the ability to distinguish between NZQF levels and record the number and year of completion of each qualification (Stats NZ, 2016). In both sub-periods, individuals with completed secondary education serve as the control group in the estimation of education-related earnings differentials. HLFS survey weights are applied to ensure population representativeness, though all reported sample sizes are unweighted.

Table 1 presents the sample composition by period. The sample is restricted to wage-earning individuals aged 25 to 64. In the full-period dataset (2009–2024), bachelor's and postgraduate degrees are aggregated, while in the post-redevelopment period (2016–2024), education categories are reported separately, including certificate-level qualifications (NZQF Levels 4–6). The sample is stable across time in terms of demographic and geographic representation. However, the observed decline in the share of tertiary-educated individuals and the emergence of a distinct certificate-level category in the post-2016 data reflect improvements in educational measurement after the HLFS redevelopment. Prior to 2016, certificate-level qualifications were not explicitly coded and may have been absorbed into either the secondary or tertiary categories, artificially inflating those proportions.

Table 1: Descriptive Statistics for Full Period (2009–2024) and Post-Redevelopment Period (2016–2024)

Variable	**2009–2024**	**2016–2024**
Education		
Postgraduate + Bachelor (%)	68.0%	52.2%
Postgraduate (%)	–	18.3%
Bachelor (%)	–	33.9%
Certificate (Levels 4–6) (%)	–	24.1%
Secondary Complete (%)	32.0%	23.7%
Demographic Characteristics		
Women (%)	55.0%	49.2%
Age (mean)	41.6	41.6
Has Children (%)	83.0%	78.5%
European (%)	63.1%	60.6%
Māori (%)	8.9%	10.5%
Pacific (%)	4.3%	5.1%
Asian (%)	20.7%	20.9%
MELAA (%)	1.6%	1.6%
Other Ethnicity (%)	1.3%	1.2%
Born in New Zealand (%)	60.5%	60.6%
Regional Distribution		
Northland (%)	2.4%	2.7%
Auckland (%)	39.5%	37.0%
Waikato (%)	8.3%	8.8%
Bay of Plenty (%)	5.0%	5.8%
Gisborne/Hawke's Bay (%)	3.5%	3.8%
Taranaki (%)	1.9%	2.1%
Manawatu-Wanganui (%)	4.1%	4.4%
Wellington (%)	13.8%	12.7%
Nelson/Tasman/Marlborough/West Coast (%)	2.9%	3.2%
Canterbury (%)	12.5%	12.9%
Otago (%)	4.6%	4.7%
Southland (%)	1.6%	1.8%
Employment and Sector		
Full-time Employed (%)	86.3%	88.3%
Agriculture, Forestry and Fishing (%)	2.5%	2.9%
Mining & Electricity (%)	1.2%	1.4%
Manufacturing (%)	7.8%	9.1%
Construction (%)	4.5%	7.8%
Wholesale Trade (%)	4.2%	4.3%
Retail Trade (%)	6.8%	7.0%
Accommodation and Food Services (%)	3.1%	3.5%
Transport, Postal and Warehousing (%)	3.5%	3.7%
Information Media and Telecommunications (%)	2.2%	1.8%
Financial and Insurance Services (%)	5.0%	4.5%
Rental, Hiring and Real Estate Services (%)	1.4%	1.5%
Professional, Scientific and Technical Services (%)	11.5%	10.1%
Administrative and Support Services (%)	2.5%	2.6%
Public Administration and Safety (%)	9.5%	9.3%
Education and Training (%)	15.0%	11.7%
Health Care and Social Assistance (%)	14.8%	13.3%
Arts and Recreation Services (%)	1.7%	1.7%
Other Services (%)	2.8%	3.8%
Observations (unweighted)	97,428	80,926

Notes: Sample includes wage-earning employees aged 25–64, excluding employers, self-employed, and those with no qualifications. Sectors follow ANZSIC06 Level 1; Mining is combined with Electricity, Gas, Water, and Waste due to small sample sizes. Percentages use survey weights (calibration factors); counts are unweighted. In 2009–2024, bachelor's and postgraduate degrees are combined due to coding limits pre-2016. Certificates (NZQF Levels 4–6) were not separately identified before 2016. MELAA = Middle Eastern, Latin American, and African.

As explained above, the analysis is divided into two sub-periods (2009–2024 and 2016–2024) to ensure comparability, given changes in how HLFS measures educational attainment. The first specification uses log-linear regressions to estimate average returns by qualification level across both periods.

3.2 Econometric Approach

To estimate the financial returns to education, we apply two methods based on the structure and availability of the data:

(1) Log-Linear Ordinary Least Squares (Log-OLS) Regressions: We begin by using a standard Mincerian approach (Mincer, 1974), where the natural log of hourly wages is modeled as a function of education and a set of control variables. This method is applied to both periods and estimates the average effect of education on earnings.

For the 2009–2024 period, due to coding limitations discussed earlier, we group bachelor's and postgraduate qualifications into a single "tertiary" category:

$$\log(wage_i) = \beta_0 + \beta_1 \cdot (Bachelor + Postgraduate)_i + \mathbf{X}_i'\gamma + \varepsilon_i \quad (1)$$

In the later period (2016–2024), the data allow for more detailed categories, so the model includes certificates, bachelor's, and postgraduate degrees as separate groups:

$$\log(wage_i) = \beta_0 + \beta_1 \cdot Certificate_i + \beta_2 \cdot Bachelor_i + \beta_3 \cdot Postgraduate_i + \mathbf{X}_i'\gamma + \varepsilon_i \quad (2)$$

(2) Quantile Regressions (2009–2024 only): To explore how returns to education vary across the wage distribution, this study estimates quantile regressions at the 20th, 40th, 60th, and 80th percentiles using the full-period dataset (2009–2024). This approach helps identify whether the benefits of higher education are concentrated at the top or bottom of the earnings scale. Following Chi and Li (2008), quantile models are useful for detecting asymmetric effects across groups—for example, gender gaps that reflect "glass ceiling" or "sticky floor" patterns. It is worth noting that upper quantiles are sometimes interpreted as reflecting high-skill or high-productivity workers, even though they do not directly measure skill (Buchinsky, 1994).

Quantile regressions require relatively large sample sizes to generate stable estimates across conditional percentiles, particularly when disaggregated by qualification type (Yang

et al., 2014). In the post-2016 sub-period, smaller cell sizes at the distribution tails and higher year-to-year volatility in educational shares would reduce the reliability of percentile estimates. Additionally, exploratory analyses showed consistent patterns between the full-period and sub-period models. Therefore, this study reports only the 2009–2024 specification to ensure robustness and avoid redundancy.

$$Q_\tau(\log(wage_i)) = \beta_{0\tau} + \beta_{1\tau} \cdot (Bachelor + Postgraduate)_i + \mathbf{X}i'\boldsymbol{\gamma}\tau + \varepsilon_{i\tau} \tag{3}$$

All models control for a wide range of factors that may affect earnings. These include age (and age squared), gender, region of residence, ethnicity, full-time employment status, parental status, country of birth, and year fixed effects. This helps to isolate the relationship between education and earnings from other demographic and labour market influences. However, since these analyses rely on observational data, the estimated effects should be interpreted cautiously as associations rather than definitive causal impacts. Potential biases due to unobserved heterogeneity, selection effects, or omitted variables cannot be entirely ruled out.

4 Results

The results are structured into two main parts. The first analyzes trends in returns across the full period (2009–2024), considering differences by age, gender, and sector. The second focuses on the post-2015 period, including a more granular view of sectoral returns by qualification level (postgraduate, bachelor, and certificate). Each subsection includes figures to visually summarize the findings and highlight emerging patterns and structural shifts in the labour market.

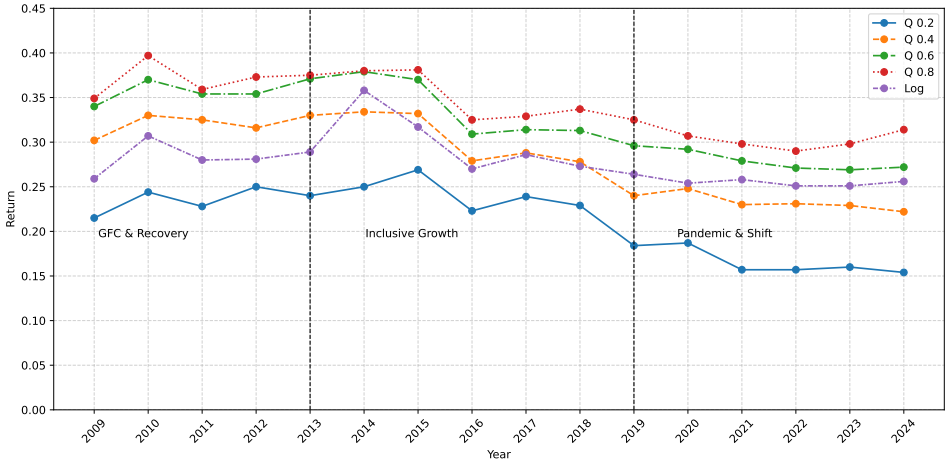
4.1 Analysis of Trends in Returns to Higher Education (2009–2024)

4.1.1 General Trends in Returns

Figure 7 shows that while returns to higher education exhibit a slightly declining long-term trend over the 2009–2024 period, this pattern is most pronounced at the lower end of the earnings distribution. During the first sub-period—coinciding with the Global Financial Crisis and its aftermath (2009–2013)—returns remained relatively stable across

earning quartiles. The subsequent period of inclusive growth and labour market tightening (2014–2019) is marked by a more visible decrease in educational returns.

Figure 7: General Trends in Returns to Higher Education (2009–2024)



The sharp decline observed specifically between 2015 and 2016 coincides precisely with the HLFS methodological redevelopment in 2016, which introduced significant changes in the measurement and coding of educational attainment. As detailed in the methodology section and documented by Stats NZ (Stats NZ, 2016), these changes improved the measurement accuracy and detail of post-school qualifications, likely contributing to an artificial structural break rather than reflecting a genuine labour market shift. Consequently, the pronounced drop in returns around this period should be interpreted cautiously as partially driven by survey-related adjustments.

Beyond this methodological shift, the overall declining trend in returns can be partially explained by structural changes in the labour market. For instance, this phase coincides with a significant increase in female labour force participation and greater inclusion of older workers and underrepresented ethnic groups (Stats NZ, 2023). These groups tend to have higher educational attainment but often face persistent wage gaps, potentially lowering the average wage premium associated with tertiary education.

Additionally, the real minimum wage rose substantially during this period, particularly between 2017 and 2020 (Ministry of Business and Employment, 2023). Increases in the minimum wage may have compressed the lower end of the wage distribution, diminishing observed returns to education at the 20th and 40th percentiles.

Post-pandemic dynamics (2020–2024) suggest a stabilization in the downward trend. Returns at the top quantile (80th) show a modest rebound, possibly reflecting rising

demand for advanced cognitive and digital skills in a technologically accelerated economy (Meehan and Watson, 2021). This suggests growing segmentation in the labour market, where only highly skilled workers are able to maintain or increase their educational wage premium.

Other factors could also explain the declining returns observed over the preceding years. First, net migration into New Zealand was consistently high and positive between 2013 and 2019, potentially increasing the supply of relatively skilled workers and thus exerting downward pressure on wage premiums. Second, the number of individuals holding bachelor's or postgraduate qualifications in New Zealand doubled between 2009 and 2023—from approximately 500,000 to 1 million (Education Counts, 2024). This rapid expansion could have diluted the average labour market value of these credentials. Additionally, it might reflect compositional changes, whereby increased tertiary enrolment could imply a broader intake, potentially reducing the average labour-market preparedness or skill intensity of graduates.

4.1.2 Returns by Age Group

Figure 8 reveals distinct patterns in the evolution of returns to higher education by age. Among the 35–44 age group, a long-term decline in returns is evident starting in 2014. However, this group also shows a clear post-pandemic recovery, particularly in the log model and at the 80th percentile. This may reflect a "catch-up" effect, where mid-career workers—able to combine experience with technological adaptability—begin to benefit from labour market shifts (Autor et al., 2008).

Figure 8: Returns to Higher Education by Age Group

In contrast, the 45–64 group exhibits a general downward trend throughout the entire period, with no clear post-pandemic rebound across any model or quantile. This suggests that older workers may face persistent challenges in capturing wage premiums from higher education, possibly due to skill obsolescence or difficulties in adapting to digital transitions (Organisation for Economic Co-operation and Development (OECD), 2023).

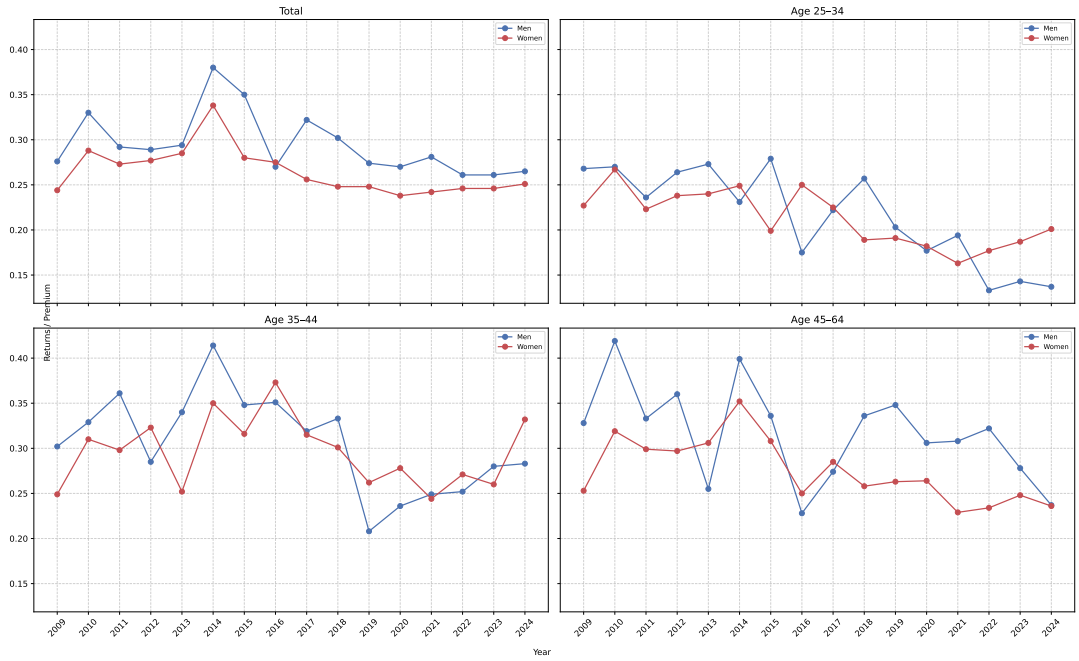
The youngest group (25–34) shows an overall declining trend as well, but with an important nuance: while the log model indicates long-term stagnation, the 80th percentile curve displays signs of recovery starting in 2021. Although this uptick was followed by a brief dip in 2022, returns resume a positive trajectory in 2023–2024. This pattern may reflect increasing demand for digital skills, which tend to be concentrated among younger, highly-educated cohorts (Deming, 2017; Meehan and Watson, 2021).

Taken together, these patterns suggest that post-pandemic recovery in educational returns has been uneven, favouring younger and mid-career workers at the upper end of the earnings distribution—likely those best positioned to take advantage of technological change.

4.1.3 Gender Gaps in Educational Returns: Age and Earnings Quantiles

Figure 9 reveals consistent gender differences in the returns to higher education across all age groups. Overall, men tend to receive higher returns than women in log-wage models. As noted in the methodology, this may be partially driven by sample composition—specifically, the exclusion of certificate-level qualifications where men are over-represented. This exclusion may artificially increase observed returns for men relative to women. Men are disproportionately concentrated in certificate-level which generally yield lower wage returns and have lower labour force participation rates. By removing this segment from the analysis, a larger share of lower-skilled men is excluded from the sample, effectively shifting the male subsample towards individuals with higher qualifications (Bachelor and Postgraduate degrees). As a result, the analysis may end up comparing a more positively selected group of men against a more representative sample of women, introducing a selection bias that exaggerates the observed gender wage gap. However, differences also vary by age group.

Figure 9: Returns to Higher Education by Gender and Age

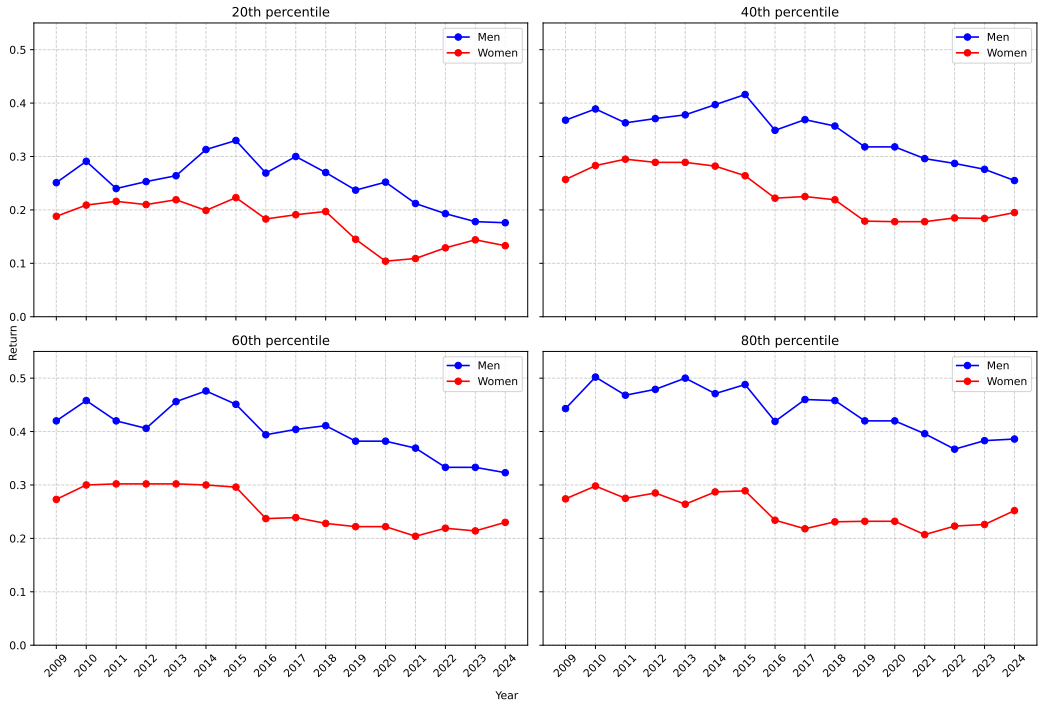


In the 25–34 cohort, women's returns have increased significantly in the post-COVID period, even surpassing men's in the most recent years. This suggests an emerging advantage for younger women, possibly due to better alignment with new labour market

demands. In the 35–44 group, both men and women have experienced rising returns since the pandemic, with signs of convergence. Conversely, in the 45–64 age group, men continue to display higher returns. This persistent gap may reflect long-term gender disparities shaped more by industry segregation—with women overrepresented in industries that tend to have lower average pay, such as Retail, Hospitality, Healthcare, and Education, particularly in support and caregiving roles—than by occupational differences per se (Iusitini et al., 2024).

Figure 10 provides a complementary perspective, showing educational returns by gender across the earnings distribution using quantile regression. At the lower end of the distribution (20th and 40th percentiles), gender differences are narrower, indicating some wage convergence in lower-paid roles. Interestingly, the downward trend in returns over time appears more pronounced for men than for women. Women's returns remain relatively stable, suggesting that the overall decline in average returns may be driven primarily by a drop in male returns.

Figure 10: Quantile Regression Estimates by Gender



At the 80th percentile, the gender gap persists and remains substantial. This pattern likely reflects structural inequalities in the labour market, particularly the underrepresentation of women in high-paying leadership roles—an example of the "glass ceiling"

dynamic often noted in the literature (Blau and Kahn, 2017; Goldin, 2014).

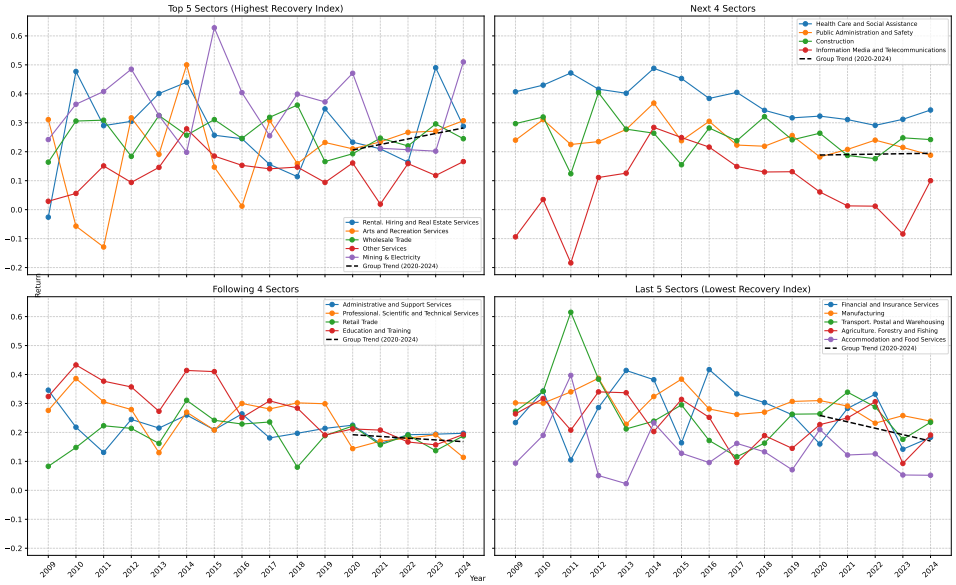
Taken together, these figures suggest two key dynamics. First, gender gaps in returns are age-dependent and not only decline but even reverse among younger cohorts—particularly in the 25–34 age group and, in some years, in the 35–44 group. Second, while convergence and reversal are more pronounced at the lower end of the earnings distribution, high-earning positions remain disproportionately occupied by men. This reinforces the need to address both vertical occupational segregation and barriers to leadership roles for women.

Figure 9 shows signs of convergence in returns between men and women, particularly among younger age groups. This may be attributed to inclusive labour policies and increasing awareness of gender equity. Figure 10 further illustrates that convergence—and in some cases, reversal—is most evident at lower quantiles, potentially due to wage standardization in less specialized roles. In contrast, significant gaps persist at the upper end of the earnings distribution, where men continue to be overrepresented in senior and high-paying roles.

4.1.4 Sectoral Analysis

Figure 11 displays the estimated log returns to higher education by economic sector over the 2009–2024 period. Sectors are grouped into four panels and ordered from top left to bottom right based on their Recovery Index, defined as the slope of returns between 2020 and 2024. This ordering captures the extent to which different sectors have recovered (or not) from the post-pandemic labour market shock.

Figure 11: Sectoral Trends in Returns to Higher Education



A key pattern emerges: sectors with higher levels of digitalisation or compatibility with remote work—such as Rental, Hiring and Real Estate Services, and Mining and Electricity—are disproportionately located in the top-left panel. These sectors exhibit both relatively high average returns and a positive post-2020 slope, suggesting that they have adapted favourably to the evolving demands of the post-COVID economy. Their resilience may be partly driven by automation, flexible work arrangements, or increased reliance on high-skilled labour.

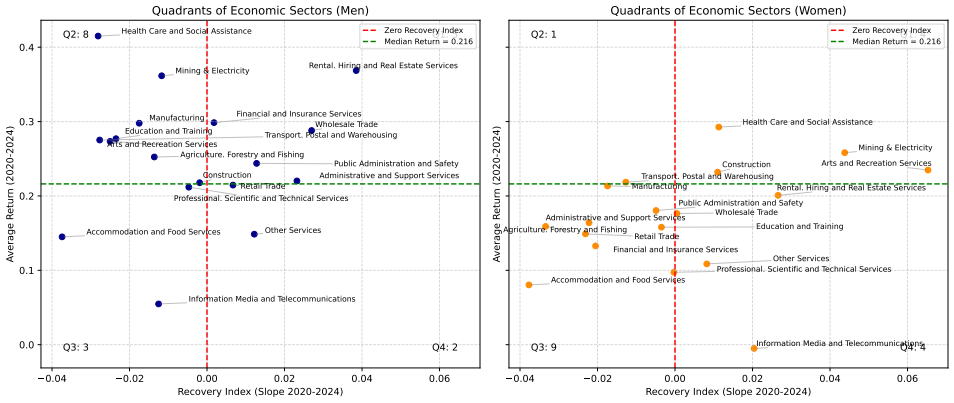
In contrast, sectors that rely on physical presence, routine tasks, or lower technological intensity—such as Accommodation and Food Services, Retail Trade, Agriculture, and Administrative Support—have shown stagnant or declining returns since the pandemic, placing them among the lower quadrants. This aligns with existing evidence that technological resilience has become a key determinant of wage structures in the aftermath of the pandemic (Autor et al., 2022).

4.1.5 Returns by Sector and Gender

Figure 12 provides a complementary perspective by disaggregating sectoral returns to higher education between 2020 and 2024 by Gender. Each point represents an economic sector positioned along two axes: the vertical axis shows the average return over this period, while the horizontal axis captures the Recovery Index, defined as the slope of

the sectoral returns post-COVID. Panels are presented separately for men and women, enabling a quadrant-based interpretation of sectoral performance and gender differences.

Figure 12: Returns by Sector and Gender



Although men show higher average returns across most sectors, the recovery dynamics are more balanced than initially assumed. Among the 18 sectors analysed, 8 have shown improvements for women (though three have slopes close to zero), while 7 have improved for men. This indicates that women are participating in the post-pandemic recovery of educational returns to a comparable extent in terms of sector count. However, men continue to exhibit higher average returns, which may reflect structural factors such as accumulated experience, sectoral segregation, and leadership representation.

Interestingly, some sectors reveal gender-specific divergences. For example, Health Care and Social Assistance is the top-returning sector for both men and women, but while male returns exhibit a slight decline post-2020, returns for women remain stable. This may suggest a growing representation of women in senior roles or that the increasing feminization of the sector is beginning to translate into more equitable returns. Similarly, in Mining and Electricity, male returns remain higher, but women show a positive slope, possibly indicating increased access or upward mobility in traditionally male-dominated fields.

In other sectors—such as Retail, Accommodation and Food Services, and Administrative and Support Services—returns for both genders are relatively low, with negative or stagnant recovery trends. Yet, these are sectors with high female employment shares, suggesting persistent structural barriers or slower adaptation post-COVID.

Overall, the figure supports the emerging narrative that, while men still enjoy higher absolute returns in most sectors, their returns have been more volatile in recent years.

In contrast, women returns have been more stable and in some cases (e.g., younger age groups or high-skill sectors) show signs of modest post-pandemic recovery. These dynamics may reflect a shifting labour market composition, where younger and more educated women are entering new sectors or assuming more strategic roles—trends that merit further exploration with occupational-level or longitudinal data.

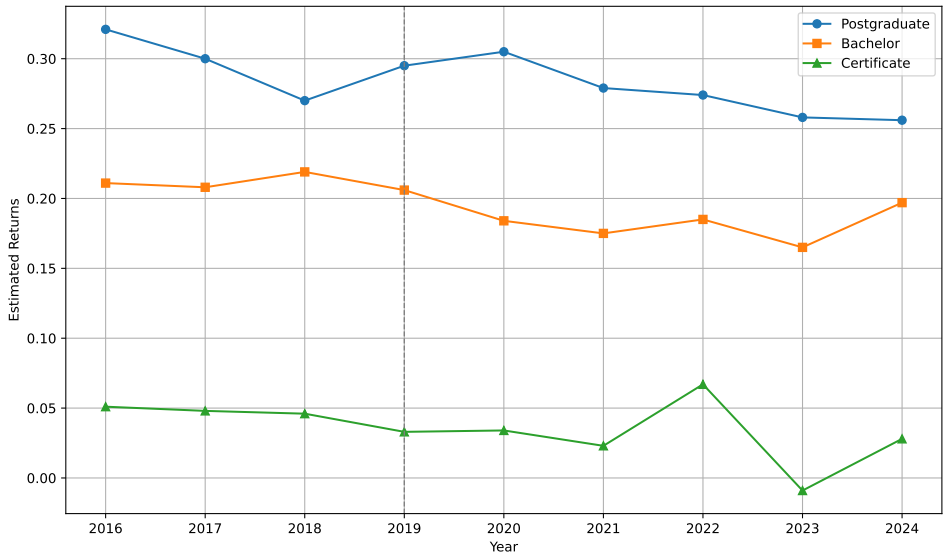
4.2 Analysis of Trends in Returns to Higher Education (2016–2024)

This section presents the estimated returns to higher education by qualification level—Postgraduate, Bachelor, and Certificate—over the 2016–2024 period. This disaggregation is only available for recent years, as consistent qualification coding in the HLFS dataset allows for comparability from 2016 onwards.

4.2.1 Trends by Educational Level

Figure 13 presents the estimated log returns to higher education for three qualification levels—certificate, bachelor, and postgraduate—between 2016 and 2024. This period allows for a consistent comparison across educational levels due to the harmonised structure of the underlying data.

Figure 13: Evolution of Wage Returns by Educational Level (2016–2024)



Postgraduate returns show a slight decline during the period, decreasing from approximately 0.30 in 2016 to 0.26 in 2024. This downward trend is more evident after

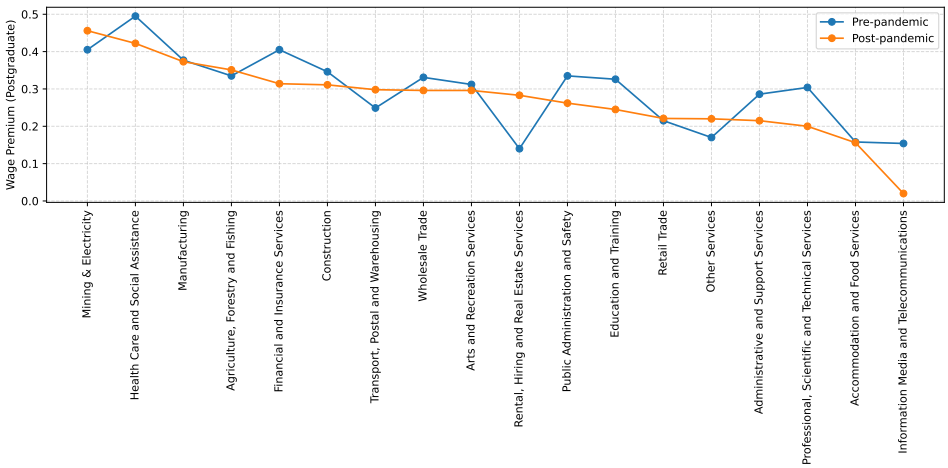
the pandemic, despite a brief recovery in 2020. In contrast, bachelor-level returns appear relatively stable and even show signs of recovery by 2024. Notably, there seems to be a substitution pattern between the two: in years where postgraduate returns decline, bachelor returns tend to rise, and vice versa. This inverse movement suggests shifting labour market valuations across educational tiers, though further analysis would be required to confirm causal mechanisms.

Certificate-level qualifications consistently exhibit the lowest estimated returns across the period, with values hovering near zero. While there is a modest increase in 2022—possibly linked to specific short-term labour market dynamics—the overall trend remains flat, with some years even showing slightly negative returns. This contrasts sharply with the relatively higher and more stable returns observed for both bachelor and postgraduate degrees.

4.2.2 Postgraduate Returns by Sector (Pre- vs Post-Pandemic)

To assess whether postgraduate educational returns have recovered across economic sectors, Figure 14 compares average returns before the pandemic (2016–2019) with those observed after the pandemic (2020–2024). Sectors are sorted from highest to lowest according to their post-pandemic returns, allowing for a clear identification of which industries currently offer the greatest wage premiums for postgraduate education.

Figure 14: Sectoral Trends in Postgraduate Wage Returns (Pre-pandemic and Post-pandemic)



A first and important observation is that overall, most sectors exhibit lower postgraduate returns post-pandemic compared to the pre-pandemic period. While postgraduate

degrees still yield the highest average returns relative to other qualification levels, the value of these credentials has declined in most industries since 2020.

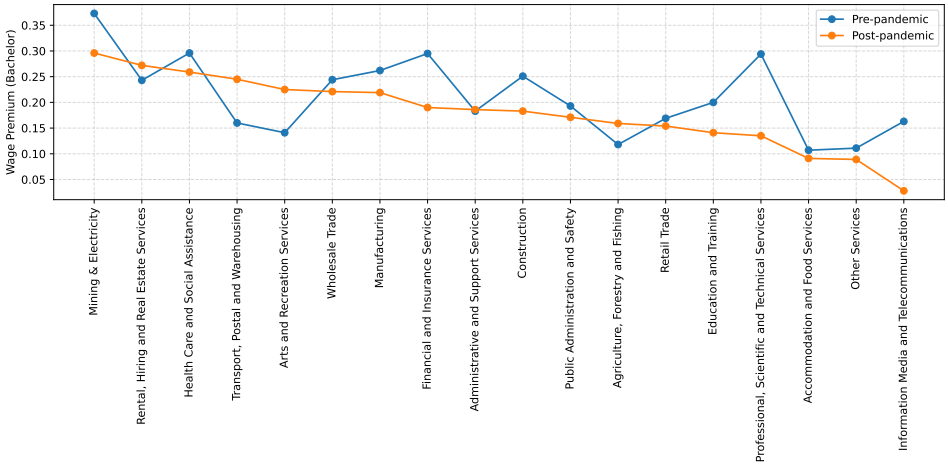
Second, the relative ranking of sectors has remained fairly stable, suggesting that the structure of wage premiums by sector has not changed dramatically despite the shock of the pandemic. Sectors like Mining and Electricity, Health Care and Social Assistance, and Manufacturing continue to be among the top performers both before and after the pandemic. Conversely, sectors such as Accommodation and Food Services, Professional, Scientific and Technical Services, and Information Media and Telecommunications remain at the bottom of the distribution.

Third, although most sectors show stagnation or decline, some industries experienced relatively notable increases. For instance, Rental, Hiring and Real Estate Services saw a considerable increase in postgraduate returns, moving from one of the lowest to a mid-tier position. Similarly, Transport, Postal and Warehousing experienced modest growth. On the other hand, Financial and Insurance Services, Professional Services, and Education and Training show notable declines in postgraduate returns, which could reflect sector-specific shifts in demand for high-level qualifications or changes in job structure.

4.2.3 Bachelor Returns by Sector (Pre- vs Post-Pandemic)

Figure 15 displays the wage premiums for bachelor degrees by sector, comparing averages between the pre-pandemic (2016–2019) and post-pandemic (2020–2024) periods. As with postgraduate returns, sectors are ordered from highest to lowest post-pandemic returns to facilitate comparison across time and sectors.

Figure 15: Sectoral Trends in Bachelor Wage Returns (Pre-pandemic and Post-pandemic)



The overall patterns are broadly consistent with those observed for postgraduate education. Most sectors exhibit a decline in bachelor-level returns relative to the pre-pandemic period, reinforcing the notion that wage premiums for higher education have diminished slightly in the aftermath of COVID-19. However, the extent of decline is more moderate than for postgraduate qualifications in many sectors.

Importantly, the sectoral ranking remains relatively stable. Industries such as Mining and Electricity, Rental and Real Estate Services, and Health Care and Social Assistance continue to deliver the highest returns, while Information Media and Telecommunications, Other Services, and Accommodation and Food Services remain at the lower end of the distribution. This stability in ranking suggests that the labour market value of a bachelor degree is still shaped by structural sectoral factors rather than short-term volatility.

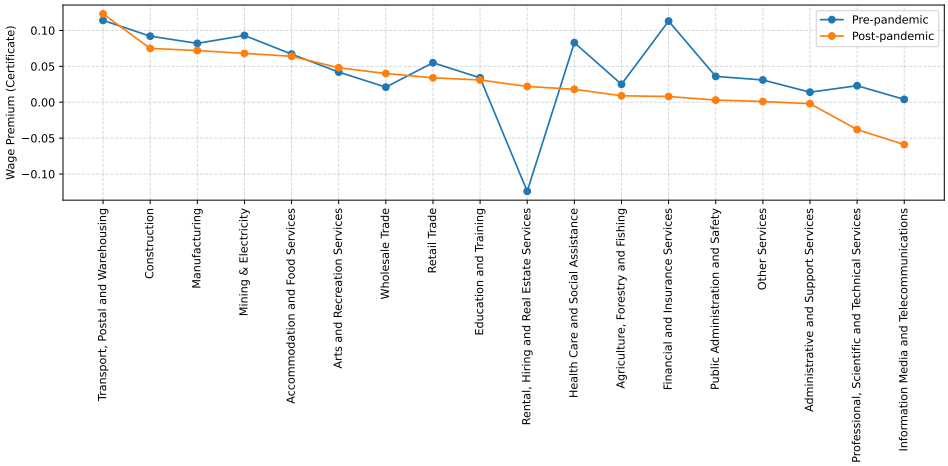
Notable changes include significant increases in returns within the Transport, Postal and Warehousing sector and the Arts and Recreation sector, as well as moderate improvements in Rental Services. On the other hand, sectors such as Financial and Insurance Services, Professional Services, and Education and Training show marked declines in bachelor returns.

Overall, while the pandemic has impacted bachelor-level returns, the structure of rewards across sectors has not shifted dramatically. The results mirror those found for postgraduate education, indicating that sector-specific dynamics—not qualification level alone—may be driving trends in educational returns.

4.2.4 Sectoral Analysis for Certificate Qualifications

Figure 16 shows the evolution of wage premiums associated with Certificate-level education, comparing the average returns for the pre-pandemic period (2016–2019) and the post-pandemic period (2020–2024) across economic sectors. Sectors are ordered from highest to lowest return in the post-pandemic period.

Figure 16: Sectoral Trends in Certificate Wage Returns (Pre-pandemic and Post-pandemic)



The most striking result is that, unlike higher educational levels, returns to Certificate-level qualifications are generally low and close to zero. In several sectors, returns are even negative, suggesting that obtaining this qualification does not necessarily translate into a wage advantage over those with only secondary education. This low profitability persists across both the pre- and post-pandemic periods.

While some sectors—such as Transport, Postal and Warehousing, Construction, and Manufacturing—show modest positive returns, these remain significantly lower than those observed for Bachelor or Postgraduate qualifications. Moreover, no clear pattern of post-pandemic recovery emerges: most sectors show similar or even lower returns than in the earlier period.

In terms of sectoral rankings, there are some notable differences compared to higher education levels. For instance, traditionally well-paid sectors like Financial and Insurance Services or Mining and Electricity do not stand out as strongly at the Certificate level, possibly indicating lower relative demand for technical qualifications in these industries. Furthermore, greater reordering in sectoral returns suggests that Certificate-level education is more volatile or sensitive to labor market conditions.

In summary, the data confirm that returns to certificate-level qualifications are generally low, stable, or declining, and rarely surpass the returns associated with higher qualification levels. A notable exception is the Information Media and Telecommunications sector, where the post-pandemic return to Bachelor-level education falls below the highest certificate-level returns. This evidence reinforces the importance of evaluating

the full range of qualifications when assessing the economic value of different types of credentials.

5 Discussion

The results of this study provide a comprehensive and updated view of how returns to higher education in New Zealand have evolved over a 15-year period marked by crisis, recovery, and structural transformation. While tertiary education remains a valuable investment, the magnitude and stability of its financial benefits have become increasingly dependent on qualification level, economic sector, and demographic profile.

In line with previous research (Zuccollo et al., 2013; Mahoney, 2014; Scott and Ali, 2024), postgraduate qualifications continue to yield high wage premiums across most sectors. However, these returns show signs of weakening after the pandemic, and the emergence of a compensatory pattern—where declining postgraduate returns are offset by slight increases in bachelor-level returns—suggests a relative reassessment by the labour market. This possible substitution effect may reflect an adjustment in the valuation of advanced credentials, potentially linked to changing skill demands or wage compression at higher levels.

By contrast, bachelor-level returns have stabilized or even declined in some sectors. Younger cohorts appear to face diminishing premiums, possibly reflecting overqualification or increased competition among degree holders. These findings echo international concerns over graduate underemployment and the declining signalling power of generalist degrees (OECD, 2024).

The decline in returns to certificate-level education is particularly striking and is concentrated in service-oriented and knowledge-based sectors. While these qualifications still offer modest benefits in technical fields such as Construction, Manufacturing, and Transport, their value is close to zero or even negative in sectors like Retail, Accommodation, and Administrative Services. One possible explanation is that some certificates are required for low-paid roles—such as food safety or customer service training—which may not lead to higher wage returns despite formal qualification. This divergence reinforces the notion that technological intensification and cognitive skill demands are reshaping the labour market, reducing the value of intermediate and routine qualifications (Hys-

lop et al., 2020; Maré, 2021b). Future research could explore this issue by analysing occupational-level returns to better capture qualification-job alignment.

The sectoral analysis also reveals key dynamics. The most resilient post-pandemic sectors—such as Mining and Electricity, Real Estate Services, and Health—have maintained strong returns to higher education. In contrast, less digitalized or more face-to-face dependent sectors—such as Retail and Accommodation—exhibit stagnant or declining returns, reflecting an uneven recovery and structural challenges in adapting to the post-COVID context.

From a gender perspective, the results show promising but still incomplete signs of convergence. Women's returns have improved at the lower quantiles of the wage distribution and among younger age groups, suggesting better access to mid- and high-tier positions. However, persistent gaps at the top end of the distribution—particularly in sectors dominated by male leadership—highlight enduring barriers to career advancement. This pattern aligns with the "glass ceiling" hypothesis and underscores the need to address vertical segregation in the labour market (Bertrand, 2018; Blau and Kahn, 2017).

Finally, the extended timeframe of this study—including the Global Financial Crisis, a phase of inclusive growth, and the COVID-19 shock—allows us to capture both the resilience and structural vulnerabilities of educational returns. Compared to earlier studies that ended before the pandemic, these findings offer a refreshed view of how technological acceleration, population ageing, and economic disruption have reshaped the value of higher education.

Taken together, these findings call for a broader reflection on public policy design in higher education. Although private returns to tertiary education have declined in several groups and levels, this should not necessarily be seen as a negative development. On the contrary, it may reflect a more inclusive expansion of the education system, where new social groups—previously excluded—are now earning credentials once held by a privileged minority. While this dynamic may lower average returns, it can also promote intergenerational equity and a fairer distribution of opportunity (Oreopoulos and Petronijevic, 2013; Goldin and Katz, 2008).

Moreover, while this study focuses on private wage returns, the benefits of higher education extend beyond individual economic gains. A broader literature suggests im-

portant social returns—including more active citizenship, better health outcomes, lower crime rates, and greater resilience to technological disruption—that strengthen the case for sustained public investment in the tertiary sector. In particular, emerging evidence highlights that Māori and Pacific learners may derive significant wellbeing gains from culturally responsive pedagogical approaches (Stephens et al., 2022; Brownie et al., 2024). These non-monetary returns are difficult to capture in conventional cost–benefit analyses, yet remain vital for building inclusive and resilient societies. As such, higher education policy should complement income-based metrics with broader wellbeing indicators to reflect its full societal value.

6 Conclusion

This paper has analyzed the evolution of economic returns to higher education in New Zealand from 2009 to 2024, using HLFS data and employing both log-linear and quantile regression techniques. The evidence suggests that while tertiary education continues to yield significant financial benefits, these returns have weakened for some qualification levels and sectors over time.

Postgraduate education remains a robust investment, consistently delivering high wage premiums even in a post-pandemic economy. Bachelor-level returns, however, have experienced some erosion, particularly in saturated or structurally changing sectors. Certificate qualifications show increased sectoral polarization, with strong returns persisting only in technical industries.

The findings highlight the critical role of sectoral dynamics, demographic factors, and economic shocks in shaping the value of higher education. They also suggest that public policy and individual educational choices should increasingly account for sector-specific trends and evolving skill demands.

Moreover, these findings open several promising avenues for future research. One priority is to explore how digital transformation and automation are reshaping the demand for qualifications, particularly their impact on sector-specific returns and career trajectories. Another is to assess the growing relevance of alternative credentials—such as micro-credentials and short courses—as potentially flexible pathways into the labour market.

In addition, more evidence is needed on the comparative effectiveness of online versus in-person education in generating economic returns, especially in the post-pandemic landscape. Subject mismatch between field of study and occupation also deserves attention, as it may erode the value of certain degrees.

In sum, while higher education remains a worthwhile investment in New Zealand, its returns have become increasingly uneven across the economy. Adapting education and labour policies to these evolving dynamics will be essential to ensure that the benefits of tertiary education continue to support both individual success and societal wellbeing in the decades ahead.

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