

Microcredentials and Employability: Evidence from Australian and French University Graduates

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Abstract.

Microcredentials have been promoted by governments and universities as a flexible means of improving graduate employability, yet evidence on their labour market value remains thin and largely descriptive. This paper examines whether stackable microcredentials improve early-career employment outcomes using graduate destination data from Australia and France. The analysis draws on linked records for 6,840 bachelor's graduates from three Australian and two French universities who completed their degrees in 2022 and 2023, of whom 1,912 had completed at least one accredited microcredential alongside or immediately after their degree. Outcomes were measured through national graduate destination surveys approximately twelve months after graduation and included full-time employment, employment in a field related to the degree, and annual salary. Propensity score matching was used to compare microcredential completers with similar non-completers on demographic, degree and institutional characteristics. Results indicate that microcredential completion is associated with a 6.1 percentage point higher probability of full-time employment and a 4.3 per cent higher salary in the pooled sample, with effects of similar direction in both countries but larger placement effects in Australia and larger wage effects in France. Microcredentials in data literacy and project management show the strongest wage and placement effects, whereas credentials in generic communication skills show no significant effect. The number of stacked credentials shows diminishing returns beyond two. The paper discusses implications for credential design, for the recognition of microcredentials by employers, and for national qualification frameworks in both countries.

Keywords: microcredentials, employability, graduate outcomes, stackable credentials, human capital

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1. Introduction

The idea that graduates should supplement a degree with short, targeted and verifiable learning has moved to the centre of higher education policy within a few years. Microcredentials, certified units of learning smaller than a full qualification that attest to specific skills, have been embraced by universities seeking new markets, employers seeking job-ready skills and governments seeking to address skills gaps. Australia has established a national microcredentials framework and France has integrated short certifications into its national skills repository, and in both the policy rationale rests substantially on the claim that microcredentials improve employability.

That claim has, however, been supported more by assertion than by evidence. Much of the available research consists of surveys of learner satisfaction, employer attitudes or institutional practice, and the few studies that examine labour market outcomes have relied on

small samples or on comparisons that do not account for the self-selection of more motivated or better-connected students into microcredential programmes. Whether the credentials add value beyond the degree, which types of credential matter, and whether stacking several credentials yields cumulative benefits remain open questions. The answers are of practical importance to students deciding how to invest their time and money, to universities designing offerings, and to governments deciding whether to subsidise them.

This paper addresses these questions using graduate destination data from Australia and France. It links administrative records on microcredential completion to national graduate outcome surveys for 6,840 bachelor's graduates and uses propensity score matching to estimate the association between microcredential completion and early-career employment outcomes. It examines effects by credential field and by the number of credentials stacked, and compares the two countries, which share a policy commitment to microcredentials but differ in labour market institutions and in the mechanisms by which credentials are recognised. The paper proceeds by reviewing the literature on microcredentials and employability, describing the data and matching methodology, presenting results and discussing their implications.

2. Literature Review

2.1 Microcredentials: definitions and policy context

The term microcredential covers offerings from digital badges for short online courses to accredited units carrying credit. Oliver (2019) proposed a widely adopted definition: a certification of assessed learning that is additional, alternate, complementary to or a component of a formal qualification, which distinguishes microcredentials from attendance certificates and establishes stackability. The European Union adopted a comparable definition and standards for quality assurance and portability (Council of the European Union, 2022), and Australia's 2021 National Microcredentials Framework set minimum requirements for volume of learning, assessment and framework alignment.

Critics observe that proliferation risks fragmenting higher education, shifting the cost of skill formation to individuals and privileging narrow employer-defined skills; Wheelahan and Moodie (2021) argue that microcredentials are promoted without evidence of the employment benefits claimed for them and that their value depends on employer recognition not yet demonstrated. This critique highlights the need for outcome evidence of the kind this study provides.

2.2 Employability and credential signalling

Employability combines the skills, credentials and social resources that enable graduates to obtain and retain work, which Tomlinson (2017) formalises as human, social, cultural, identity and psychological capitals. Two theories inform the expected relationship between microcredentials and outcomes. Human capital theory holds that education raises productivity and that employers reward the resulting skills (Becker, 1993), so microcredentials should matter to the extent that they develop scarce, productive skills. Signalling theory holds that credentials convey information about unobservable ability or motivation (Spence, 1973), so microcredentials may be rewarded as signals of initiative, depending on the credibility of the issuer and the visibility of the credential. The two perspectives therefore predict different patterns across credential fields.

Empirical research on short credentials has focused on community college certificates in the United States, where administrative data show positive but heterogeneous returns, larger in health and technical fields and smaller or absent for generic credentials (Bahr et al., 2015).

For university microcredentials, Kato et al. (2020) concluded for the OECD that robust evidence on employment outcomes was lacking and that value would depend on integration with qualification frameworks and employer recognition.

2.3 Graduate outcomes in Australia and France

Both countries maintain national graduate destination surveys. Australia's Graduate Outcomes Survey collects employment status, occupation, salary and job relevance some months after completion (Quality Indicators for Learning and Teaching, 2023), and France's insertion professionnelle surveys collect comparable data at 18 and 30 months. These surveys have documented persistent variation by field, institution and background and have been used to evaluate work-integrated learning (Jackson & Bridgstock, 2021); the present study extends this tradition to microcredentials.

The two labour markets differ in ways that may condition the value of microcredentials. Australia has a flexible market with high graduate employment, a strong graduate premium and a hiring culture in which employers screen on skills and experience; France has a more regulated market, higher youth unemployment, a strong credentialist tradition in which the level and type of diploma structure access to occupations, and a national skills repository that gives registered certifications formal recognition. On signalling grounds registered microcredentials might carry more weight in France; on human capital grounds skills-focused credentials might be rewarded more directly in Australia. The comparison provides an opportunity to examine these expectations.

3. Methodology

3.1 Data

The study used linked records from five universities: three Australian universities in Melbourne and Sydney and two French universities in the Paris region. Each institution provided anonymised records of bachelor's graduates from 2022 and 2023, including field of study, grade point average or equivalent, demographic characteristics, prior work-integrated learning and completion of any accredited microcredential offered by the university or by a partner recognised under the national framework. These records were linked to the graduates' responses to the national destination surveys, conducted between six and eighteen months after graduation, subject to consent provisions in each country. After exclusion of graduates who proceeded directly to further full-time study and of records with missing outcome data, the analytic sample comprised 6,840 graduates, of whom 4,120 were Australian and 2,720 were French. Table 1 summarises the sample. Microcredential completers numbered 1,912, or 28.0 per cent of the sample, with a higher completion rate in Australia than in France.

Table 1: Sample characteristics and microcredential completion (N = 6,840)

Characteristic	Australia (n = 4,120)	France (n = 2,720)	Total (N = 6,840)
Female (%)	56.2	58.9	57.3
Mean age at graduation (years)	23.4	23.1	23.3
Business and management (%)	31.5	27.6	29.9
Science, engineering and IT (%)	34.8	38.2	36.2
Humanities and social sciences (%)	33.7	34.2	33.9
Completed work-integrated learning (%)	47.3	61.8	53.1
Completed at least one microcredential (%)	31.2	23.1	28.0

Completed two or more microcredentials (%)	11.7	7.4	10.0
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Source: Linked university records and national graduate destination surveys (2022–2023 cohorts)

3.2 Measures

Three outcome measures were used. Full-time employment was a binary indicator of employment of 35 hours or more per week at the time of the survey. Field-related employment was a binary indicator that the respondent rated their job as related or closely related to their degree. Salary was the annual gross salary of those in full-time employment, expressed in national currency and analysed as a natural logarithm. Microcredential completion was coded from institutional records as a binary indicator and as a count. Credentials were classified into five fields according to their content: data literacy and analytics, project management, digital marketing and communication, generic communication and teamwork, and industry-specific technical credentials. Covariates included gender, age, domestic or international status, socio-economic indicator, field of study, grade point average, work-integrated learning completion, institution and graduation year.

3.3 Analysis

Because students who complete microcredentials may differ systematically from those who do not, simple comparisons would conflate the effect of the credential with the characteristics of those who choose to obtain it. Propensity score matching was used to reduce this bias (Rosenbaum & Rubin, 1983). A logistic regression of microcredential completion on the covariates was estimated separately for each country and matched samples were constructed using nearest-neighbour matching with a calliper of 0.05 standard deviations of the propensity score and replacement. Balance was assessed through standardised mean differences, all of which were below 0.10 after matching. Average treatment effects on the treated were estimated for each outcome, with bootstrapped standard errors. Effects by credential field and by number of credentials were estimated by re-running the matching for each subgroup of completers against the pool of non-completers. Sensitivity to unobserved confounding was assessed using Rosenbaum bounds. The analysis was conducted in R using the MatchIt package (Ho et al., 2011).

4. Results

4.1 Overall effects of microcredential completion

Table 2 presents the matched estimates of the association between microcredential completion and the three outcomes for the pooled sample and for each country. In the pooled sample, completers were 6.1 percentage points more likely to be in full-time employment than matched non-completers, 4.8 percentage points more likely to be in field-related employment, and earned 4.3 per cent higher salaries, all statistically significant. The effects were in the same direction in both countries but differed in magnitude. The employment effect was larger in Australia, at 7.4 percentage points, than in France, at 4.2 points, whereas the salary effect was larger in France, at 5.6 per cent, than in Australia, at 3.5 per cent. The field-related employment effect was similar in the two countries. Rosenbaum bounds indicated that the employment and salary effects in the pooled sample would remain significant unless an unobserved confounder increased the odds of completion by a factor of about 1.6, which suggests moderate robustness to hidden bias.

Table 2: Matched estimates of microcredential effects on graduate outcomes (average treatment effect on the treated)

Outcome	Pooled (N = 6,840)	Australia (n = 4,120)	France (n = 2,720)
Full-time employment (percentage points)	6.1*** (SE 1.4)	7.4*** (SE 1.7)	4.2* (SE 2.1)
Field-related employment (percentage points)	4.8** (SE 1.6)	5.0** (SE 1.9)	4.5* (SE 2.3)
Log salary, full-time employed (per cent)	4.3*** (SE 1.1)	3.5** (SE 1.3)	5.6** (SE 1.8)
Matched completers (n)	1,912	1,285	627
Standardised mean difference after matching (max)	0.07	0.08	0.09

Source: Authors' analysis of linked records and destination surveys. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; bootstrapped standard errors

4.2 Effects by credential field and stacking

The effects varied considerably by the field of the credential, as shown in Table 3. Credentials in data literacy and analytics and in project management showed the strongest wage and placement effects, with full-time employment effects of 9.2 and 8.1 percentage points and salary effects of 6.8 and 5.9 per cent respectively. Industry-specific technical credentials showed moderate positive effects. Credentials in digital marketing and communication showed a small and marginally significant employment effect and no significant salary effect. Credentials in generic communication and teamwork skills showed no significant effect on any outcome. The pattern was consistent across the two countries, although the data literacy effect on salary was especially pronounced in France.

Table 3: Matched effects by credential field and number of credentials (pooled sample)

Credential field or count	Completers (n)	Full-time employment (pp)	Field-related employment (pp)	Log salary (%)
Data literacy and analytics	486	9.2*** (SE 2.3)	6.9** (SE 2.5)	6.8*** (SE 1.8)
Project management	412	8.1*** (SE 2.4)	6.2* (SE 2.6)	5.9** (SE 1.9)
Industry-specific technical	358	5.7* (SE 2.6)	7.4** (SE 2.7)	3.6* (SE 1.8)
Digital marketing and communication	371	4.1 (SE 2.5)	2.8 (SE 2.7)	1.9 (SE 1.9)
Generic communication and teamwork	285	1.6 (SE 2.9)	1.1 (SE 3.0)	0.7 (SE 2.2)
One credential only	1,228	5.2*** (SE 1.6)	4.1* (SE 1.8)	3.7** (SE 1.3)
Two credentials	497	8.3*** (SE 2.3)	6.5** (SE 2.5)	5.8** (SE 1.8)
Three or more credentials	187	8.9** (SE 3.4)	6.8 (SE 3.6)	6.1* (SE 2.7)

Source: Authors' analysis of linked records and destination surveys. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Stacking showed diminishing returns. Graduates who completed two credentials had larger effects on all outcomes than those who completed one, with the employment effect rising from 5.2 to 8.3 percentage points and the salary effect from 3.7 to 5.8 per cent. Completing three or more credentials, however, produced effects that were only marginally larger than those for two, and with wider confidence intervals given the smaller number of

completers. Additional analysis, not tabulated, indicated that the gain from a second credential was largest when the two credentials were in complementary fields, for instance data literacy combined with project management, and smallest when both were in the same field.

4.3 Variation by degree field

Effects also varied by the graduate's degree field. The employment and salary effects of microcredentials were largest for graduates in humanities and social sciences, for whom a data literacy or project management credential appeared to compensate for the absence of applied skills in the degree, and smallest for graduates in science, engineering and information technology, whose degrees already certify technical competence. Business graduates occupied an intermediate position. This pattern is consistent with the interpretation that microcredentials add value where they supply skills that the degree does not signal, rather than where they duplicate it.

5. Discussion

5.1 Do microcredentials improve employability?

The results indicate that accredited microcredentials are associated with modest but meaningful improvements in early-career outcomes in both countries after matching on observed characteristics. The pooled effects of six percentage points on employment and four per cent on salary are comparable to those of work-integrated learning in Australia (Jackson & Bridgstock, 2021) and to the lower range of returns to short credentials in the United States (Bahr et al., 2015). They offer some support for the policy claims that Wheelahan and Moodie (2021) criticised as unsupported, while confirming their concern that value is highly uneven.

The heterogeneity by field is the most important result. Strong effects for data literacy and project management and none for generic communication are consistent with human capital theory (Becker, 1993): credentials certifying scarce, productive skills are rewarded, while those certifying skills employers assume graduates already possess are not. Signalling (Spence, 1973) is not excluded, but the absence of any effect for generic credentials suggests that obtaining a credential is not rewarded in itself. Larger effects for humanities and social science graduates support a complementarity interpretation: microcredentials add value where they fill a gap in the skill profile the degree signals.

Two further checks support robustness. Restricting the analysis to credentials completed before the final semester produced estimates within one percentage point of those reported, reducing concern about reverse causation from graduates who enrolled after struggling to find work, and institution fixed effects and alternative callipers of 0.02 and 0.10 produced substantively identical results. Neither eliminates selection on unobservables, but with the Rosenbaum bounds and the consistency of effects across two different countries they suggest the associations are not artefacts of modelling choices.

5.2 Country differences and recognition

The larger employment effect in Australia and larger salary effect in France are consistent with the institutional differences reviewed above: flexible skills-based screening lets a credential influence the probability of obtaining a position, whereas formal recognition of registered certifications in French wage classifications lets it influence the salary attached to one. These interpretations require employer-side data to confirm, but they suggest that the mechanism depends on national institutions, as Kato et al. (2020) and the Council Recommendation's emphasis on recognition (Council of the European Union, 2022) anticipate.

5.3 Implications for design and policy

For universities, portfolios should concentrate on skills that are scarce, verifiable and complementary to degree content, designed to stack in complementary pairs; diminishing returns beyond two imply that students should invest in a few well-chosen credentials. For employers, data and project management credentials are informative signals that could be built into recruitment criteria. For governments, the results support investment in accredited microcredentials integrated with qualification frameworks but caution against indiscriminate subsidy, since many credentials showed no return. The Australian framework's assessment and alignment requirements (Oliver, 2019) and French registration in the national skills repository both appear to support recognition and should be maintained.

6. Conclusion

This paper examined whether stackable microcredentials improve early-career employment outcomes using graduate destination data for 6,840 bachelor's graduates in Australia and France. Propensity score matching indicated that microcredential completion is associated with a 6.1 percentage point higher probability of full-time employment and a 4.3 per cent higher salary, with larger placement effects in Australia and larger wage effects in France. Microcredentials in data literacy and project management showed the strongest wage and placement effects, industry-specific technical credentials showed moderate effects, and generic communication credentials showed none. Stacking two credentials, particularly in complementary fields, yielded larger effects than one, with diminishing returns thereafter. The findings provide the first matched-sample evidence on the labour market value of university microcredentials across two national systems and indicate that their value is real but conditional on content, complementarity and recognition.

The study has limitations that should be acknowledged. Matching addresses selection on observed characteristics only, and unobserved differences in motivation or networks between completers and non-completers may account for part of the estimated effects, although sensitivity analysis suggests moderate robustness. Outcomes were measured within eighteen months of graduation and may not reflect longer-term career trajectories. The sample was drawn from five universities in metropolitan areas and may not represent regional institutions or vocational providers. Future research should follow cohorts over longer periods using the longitudinal components of the national surveys, incorporate employer data on recognition and hiring decisions, extend the comparison to additional countries with different credential recognition systems, and examine microcredentials completed by workers later in their careers rather than at graduation.

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