# THE EXPANSION OF VOCATIONAL COURSES IN PORTUGAL

## What Are Its Impacts on Education, Employment and Entrepreneurship?

Pedro S. Martins, Luís Catela Nunes, Pedro Reis e Teresa Thomas

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# Executive Summary

This policy paper focuses on the broad expansion of vocational education and training (VET) courses in upper secondary education in Portugal since 2006. It employs micro data to analyse how this expansion has impacted education outcomes, employment and entrepreneurship. Additionally, the paper also offers policy recommendations to build on the generally positive results observed while addressing the challenges facing the VET system.

# 1. Introduction

Vocational education and training (VET) is a crucial component of many education systems around the world. VET can be defined as "training in skills and teaching of knowledge related to a specific trade, occupation, or vocation in which the student or employee wishes to participate." [source: link].

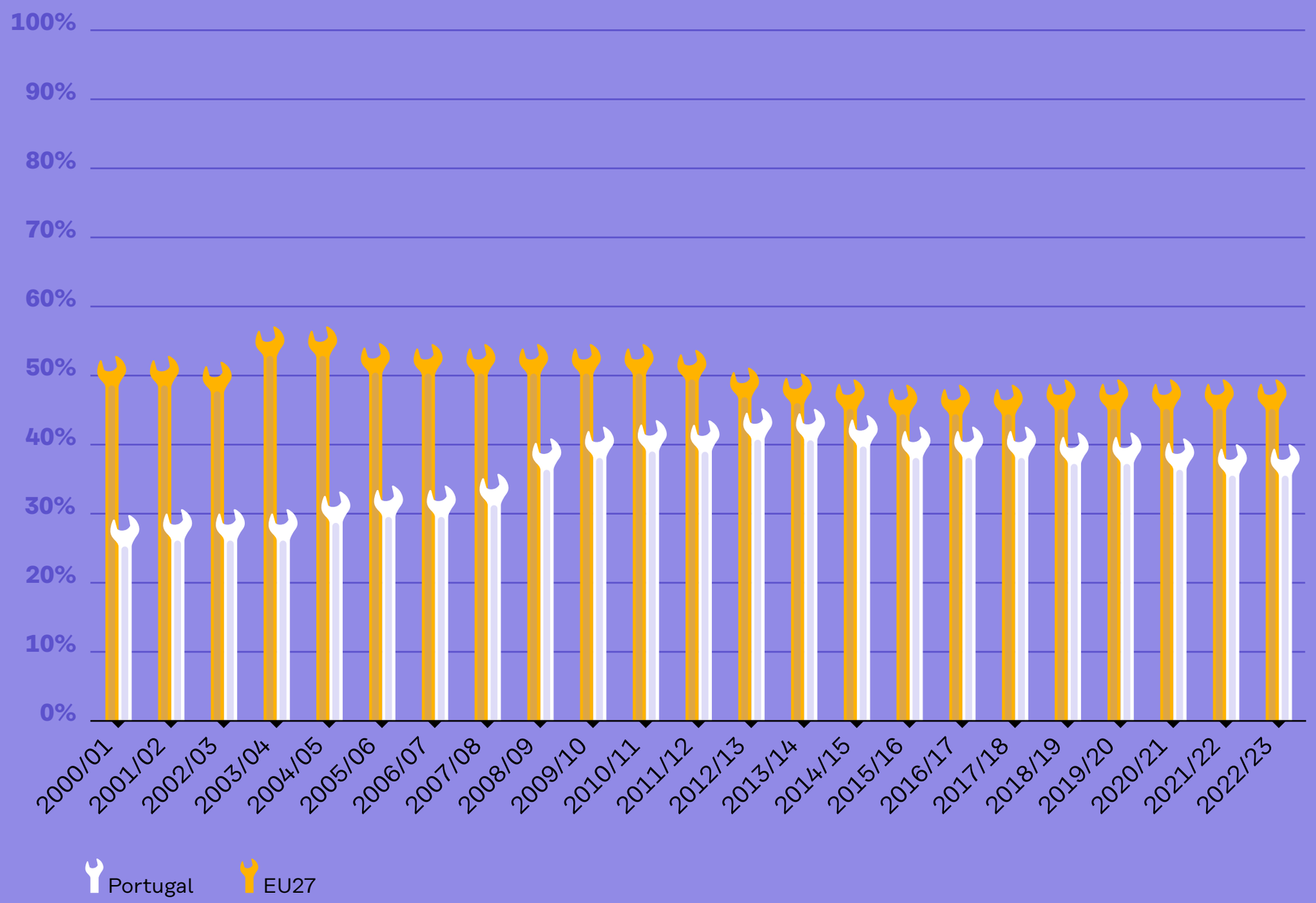
At the beginning of the 21st century, Portugal lagged behind most European Union countries in terms of the percentage of young students enrolled in VET courses. During the academic year 2000/2001, only 28% of students in upper secondary education in Portugal were enrolled in some type of VET course, well below the EU-27 average of 52%.

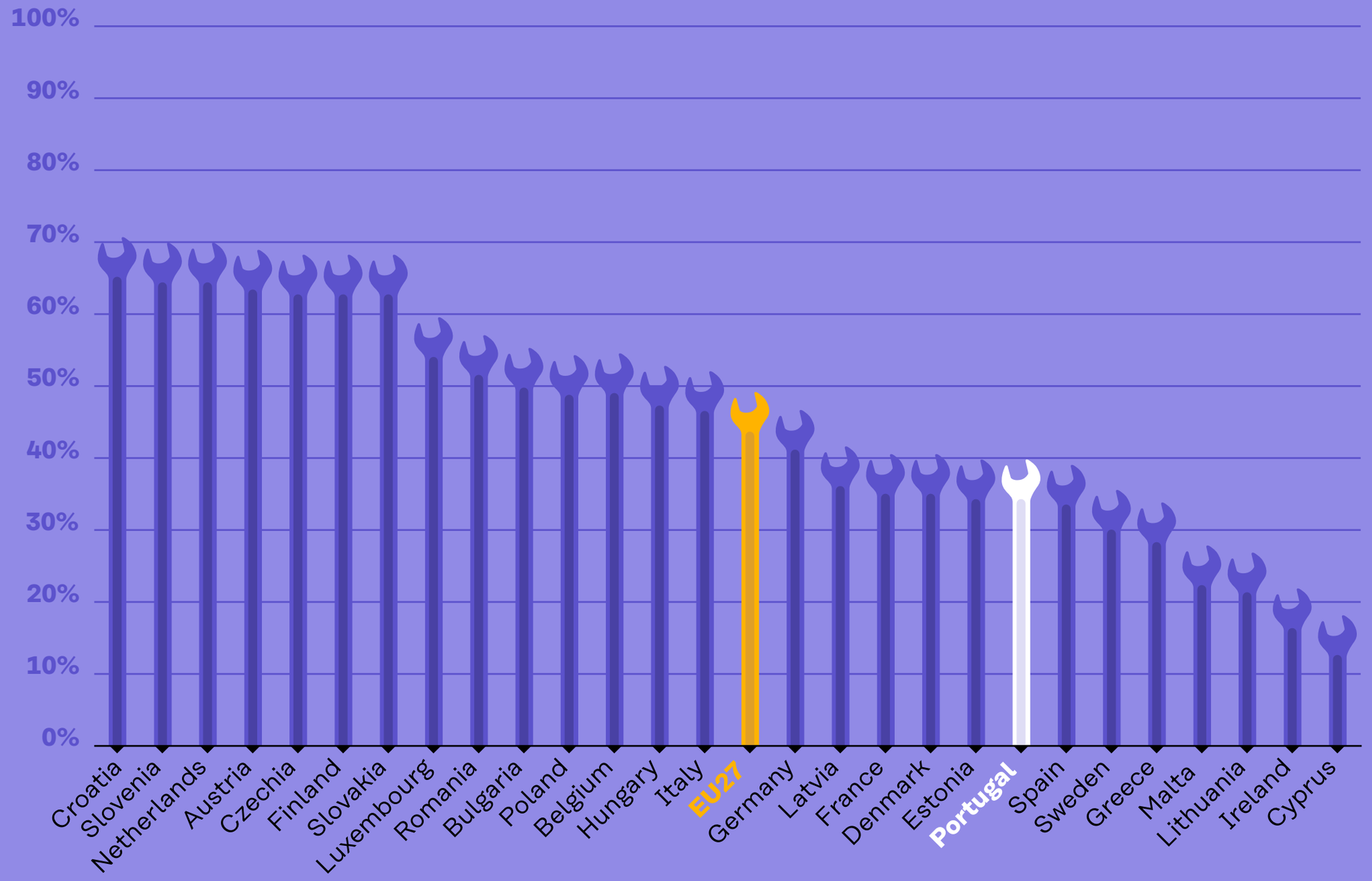
However, the significant expansion of VET courses in Portugal **since 2006 led to a sharp rise in the percentage of upper secondary students enrolled in VET, peaking at 45% in 2013/2014**. This figure later decreased slightly, yet still remains close to 40%. Portugal is now closer to the EU average than it was at the turn of the 21st century, which has hovered around 50%, with a degree of fluctuation.

The percentage of upper secondary education students enrolled in VET varies drastically by country. In 2021/2022, this figure was around 20% in Cyprus and Ireland, 40% in Portugal, France and Spain and rising to around 70% in Austria, the Netherlands, Slovenia and Croatia.[1]

## F1. Percentage of upper secondary education students enrolled in VET courses

Sources: UNESCO, Directorate-General for Education and Science Statistics (DGEEC)






**F2. Percentage of upper secondary education students enrolled in VET, 2021/2022**

Sources: Eurostat, DGEEC

Several factors account for the increase of upper secondary education students enrolled in VET in Portugal since the beginning of this century:

+ Traditional academic pathways were not engaging or suitable for all students, particularly those at risk of disengaging from school, with extremely high dropout and failure rates (39%) in 2000/2001.

+ Educational offerings lacked diversity, with a shortage of courses combining general academic skills with specialised professional skills that facilitated seamless transitions into the labour market.

+ In 2009, the compulsory schooling age was raised from 15 years old (9th grade — lower secondary level) to 18 years old (12th grade — upper secondary level), necessitating an expansion of upper secondary course offerings.

+ Finally, funding for VET via the European Social Fund.[2]

Further reforms and investment in VET are likely to emerge soon at the European level, as the European Commission's plans to implement a strategy for developing an attractive and innovative VET system will likely result in further reforms and investment in VET at the European level [link]. **Portugal, meanwhile, intends to continue expanding VET, with a stated objective of enrolling 55% of all upper secondary school students in VET programmes**. [link]

The significant investment and planned reforms in VET demand rigorous scrutiny to evaluate their impact. **The available evidence for Portugal suggests that the recent VET expansion produced the following positive results**:

+ Increased upper secondary education completion,[3] with the failure and dropout rate falling below 10% in 2022/2023.

+ Decreased inactivity rates: In 2023, the inactivity rate among young adults aged 25-34 with upper secondary VET was notably low at 5.6%, significantly below the rate for those with a general education (10.6%) and below the EU and OECD averages (around 11%).[4]

+ Accelerated entry into the labour market: **72% of the recent graduates from VET secure work within 1 to 2 years, compared to 56% of those from general education**.[5]

+ Higher wages for workers with a vocational upper secondary degree compared to workers with a general upper secondary degree.[6]

This policy paper examines in greater depth the impact of the recent expansion of VET courses in Portugal across two significant dimensions:

+ Did the expansion of VET courses in Portugal impact employment in the specific occupations targeted by those courses? Specifically, the analysis examines how opening new upper secondary professional courses (*cursos profissionais*) after 2006 impacted employment in the corresponding professional occupations. We look at impacts at both local and regional scales: the former is assessed at the municipality level; the latter at the NUTS3 (Nomenclature of Territorial Units for Statistics) level.

+ What impact has the expansion of VET courses had on business creation and entrepreneurship? VET programmes' emphasis on practical skills has contributed to a larger, more specialised workforce as VET has expanded. This growing pool of skilled professionals could potentially increase new business creation, particularly in specific sectors of the economy.

# 2. Professional Courses in Portugal

All upper secondary VET courses in Portugal offer dual certification:

+ An academic component that allows students to complete upper secondary education and pursue higher education.

+ A professional qualification focused on practical, job-specific skills, often including internships and apprenticeships to facilitate transition into the labour market.

The broad expansion of VET courses in upper secondary education since 2006 was driven by the expansion of professional courses.[7] From 2005/2006 to 2009/2010, the percentage of upper secondary students enrolled in professional courses rose significantly, from 13% to 31%.

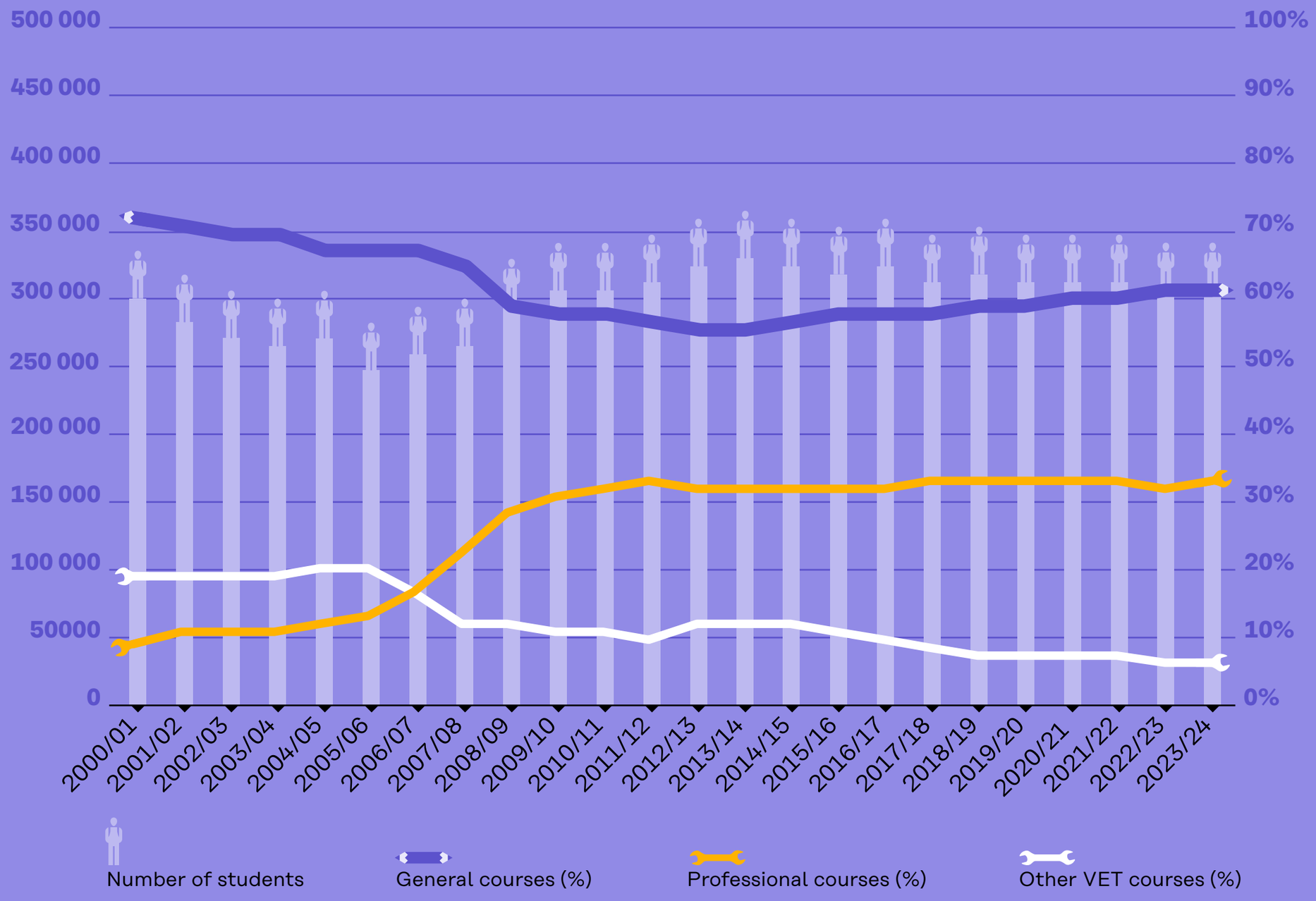
**Professional courses last for three years**, in line with the general courses of the academic track in upper secondary education. **Their curriculum combines sociocultural and scientific subjects with specific technological modules, in addition to on-the-job training**.[8]

Professional courses now constitute the majority of VET offerings in upper secondary education, with public schools providing a significant proportion of these.

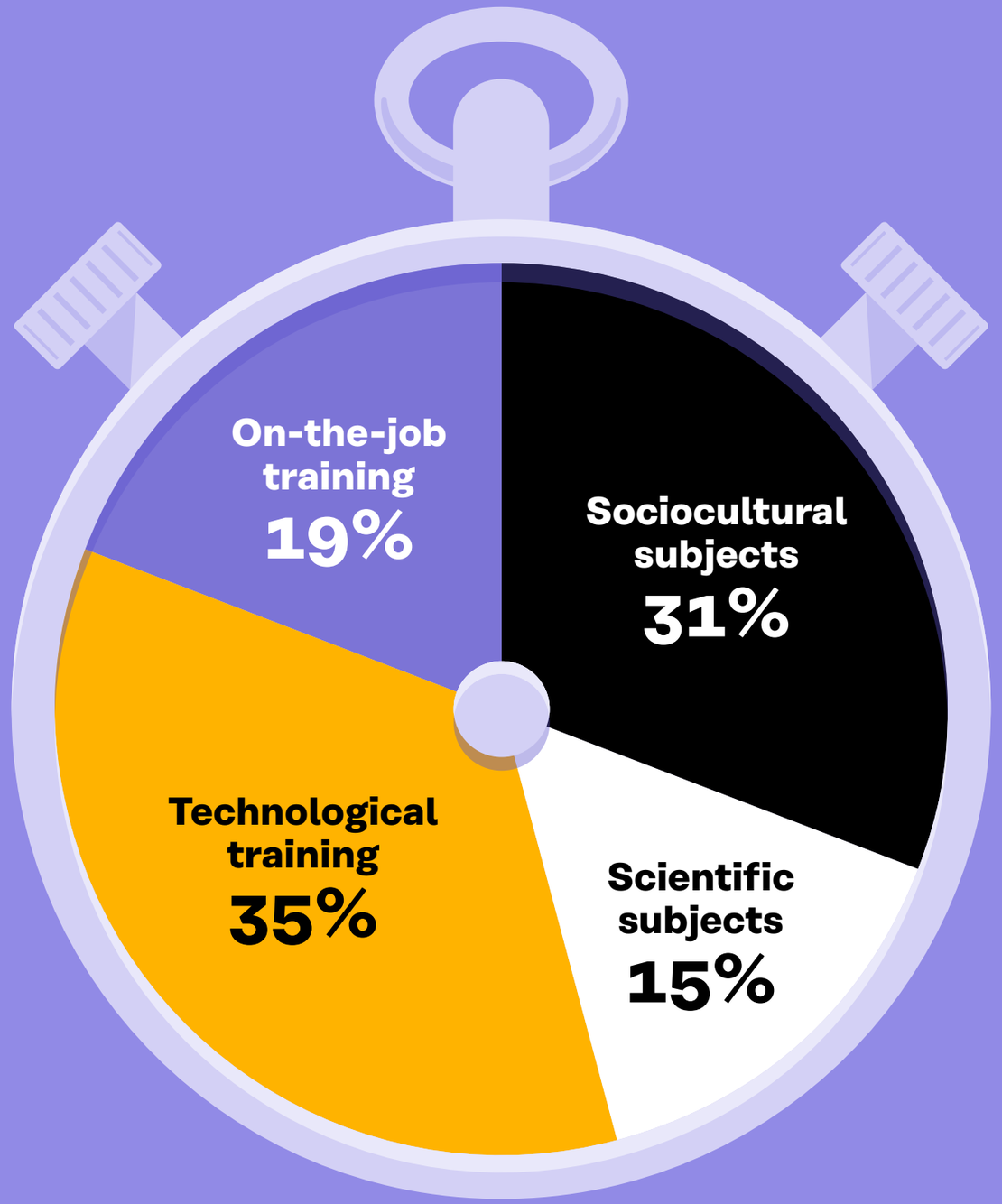
+ In the 2023/2024 academic year, 84% of VET students were enrolled in professional courses.

+ Of these, 59% attended public schools, a significant increase from just 8% in 2000/2001.

## F3. Number of students enrolled in upper secondary education and percentages in general courses, professional courses and other VET courses (excluding adult education)




Sources: DGEEC — 75 Anos de estatísticas da Educação em Portugal, 2023; Estatísticas da Educação from 2021/2022 to 2023/2024.




**F4. Typical workload of professional courses over their 3-year programme duration**

Between 2006/2007 and 2018/2019, 4,328 new professional courses were launched.[10] The first cohorts of students enrolled in these new courses reached grade 12 between 2009 and 2021. The 2007/2008 academic year marked the highest number of new course introductions, with a total of 867 courses launched. After 2012/2013, the number of new course openings slowed, stabilising at around 140 to 240 per year.

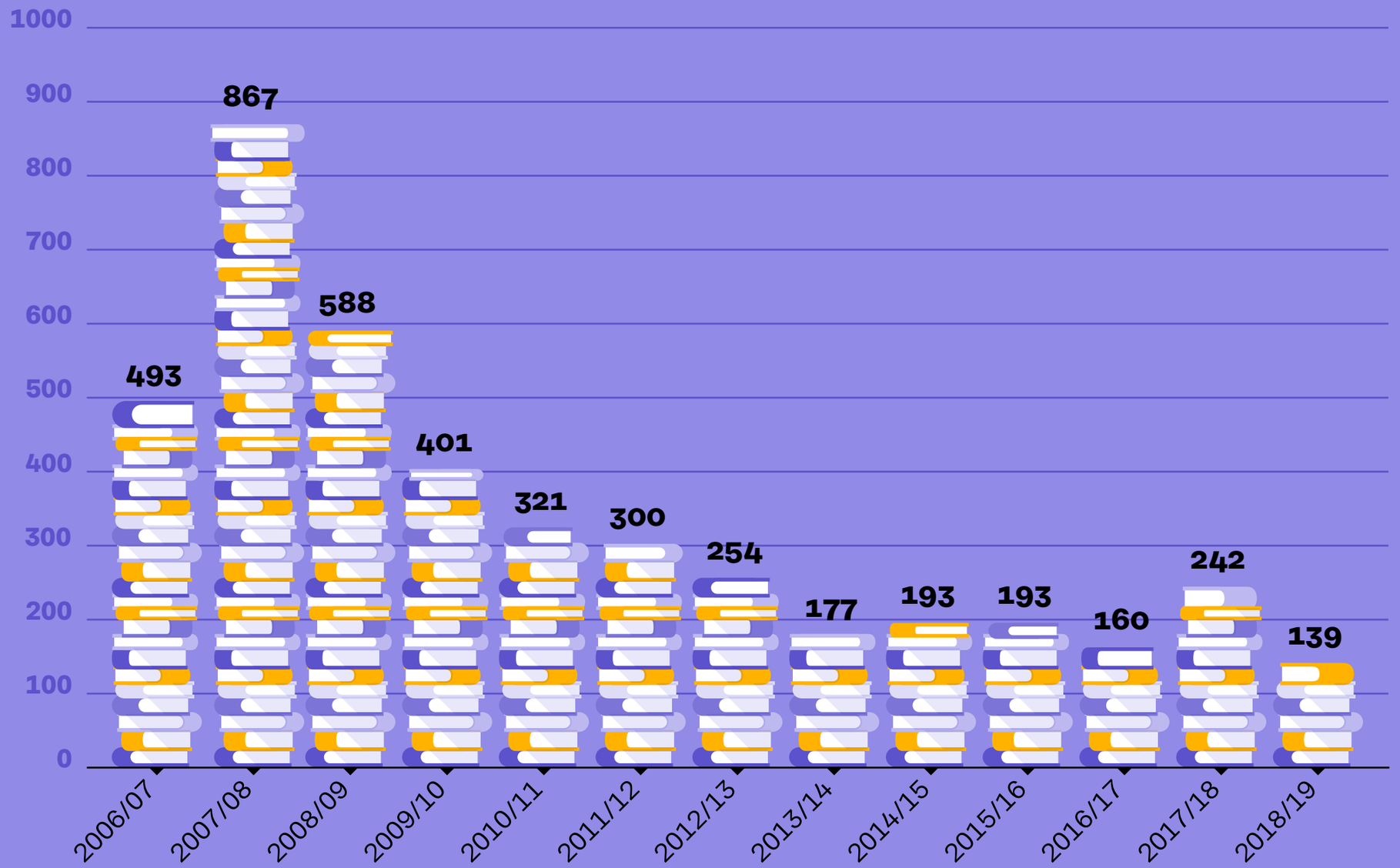
**Regarding education and training fields, "Computer Science accounts" for the largest share of new professional courses, at over 12% (546 courses), followed by Hospitality and Catering at 9% (367 courses) and Tourism and Leisure at 7% (315 courses).**[11]

Geographically, the new professional courses are primarily concentrated in the more densely populated areas. Rural inland regions, on the other hand, such as Alentejo, Trás-os-Montes and parts of the Algarve, show fewer or no new course openings.

According to the NUTS2-2013 regional classification, the North and Centre regions recorded the highest numbers of new courses, with 1,544 and 1,480, respectively. They were followed by Alentejo (559) and the Lisbon Metropolitan Area (494), while the Algarve registered the fewest, with just 251 new courses. Notably, the latter two regions also have more limited access to European funds and face lower co-funding rates, which may help explain these disparities.

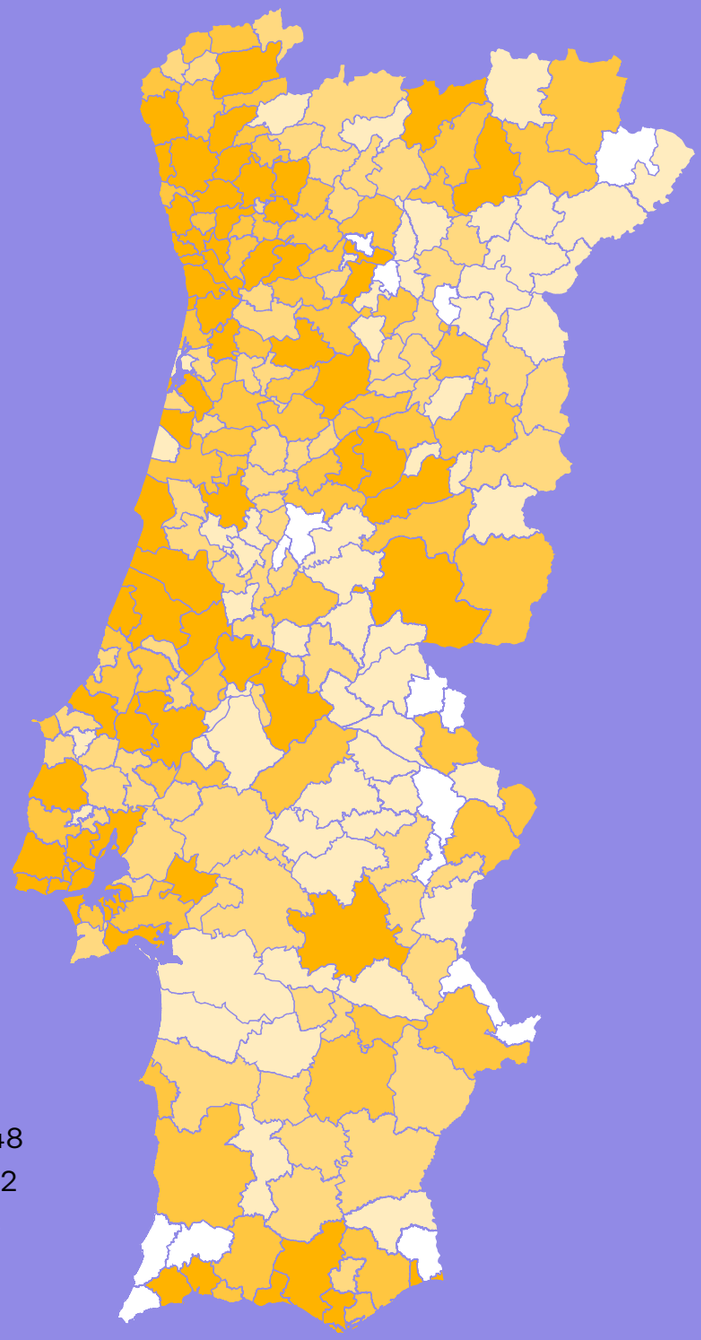


11 \ Professional Courses in Portugal




**F5. Number of new professional courses launched by academic year**[12]

Source: authors' calculations based on data from DGEEC.




## F6. Number of new professional courses launched in each municipality (2006/07-2018/19)

Source: authors' calculations based on DGEEC data

# 3. The impacts of the expansion of professional courses

## A. Methodology

This section examines the impacts of the significant expansion of professional courses since 2006. Specifically, it analyses whether the phased introduction of new professional courses in various professions across municipalities in mainland Portugal resulted in either increased employment of VET graduates in those occupations or the creation of new businesses in the related sectors of economic activity. The analysis focuses on the new professional courses introduced between 2006/2007 and 2018/2019, with the first student cohorts graduating between 2009 and 2021.

We use the following approach to study how the introduction of new professional courses affected outcomes — such as employment or new business creation — over time and across different municipalities and sectors.[13]

+ Given that new courses were introduced in different municipalities and years, the analysis treats each introduction as an event, allowing us to compare changes in outcomes before and after the introduction of each course.

+ For each municipality and sector where a new course is introduced, we track how outcomes evolve year by year, starting from the year before the first cohort graduates. This allows us to discern not only whether the course has an effect, but also how that effect changes over time — for example, whether the impact increases, decreases or remains stable following graduation.

+ To isolate the effect of the new courses, we use municipalities and sectors that never introduced a new course as a control group.[14] These serve as a benchmark for the outcomes we would expect had the new course not been introduced.

+ We compare the changes over time between municipalities and sectors that introduced a new course and those that did not, measuring the effect in each year following graduation of the first cohort.

+ Finally, we also examine trends in the years before graduation to account for any pre-existing differences between the two groups.[15]

## B. Impact on Employment

This section evaluates whether the significant expansion of professional courses translated into higher employment in the corresponding occupational fields[16] in the municipality of the school where the course was introduced.[17] Using the Tables of Personnel[18] datasets pertaining to 2002-2022, we are able to track the number of employees with a VET upper secondary degree in the various occupations each year.[19]

The table below shows the average impact of introducing a new professional course for a specific occupation at the municipality level,[20] reporting changes in the number of workers in the year the first cohort graduates (year 0) and in subsequent years.

**Impact of the creation of the new professional courses on employment (in number of workers) in the corresponding occupation at the municipality level**

| Number of years after graduation | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Impact on the number of workers | -0.03 | 0.05 | 0.14** | 0.17** | 0.18* | 0.20* |
| Impact in % | -3% | 4% | 11%** | 14%** | 14%* | 16%* |

Notes: The average number of workers across all combinations of municipalities and occupations (at the 4-digit CPP) in the year before graduation equals 1.25. Impact in % is calculated in relation to that average. *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Source: authors' calculations based on Tables of Personnel 2002-2022 and DGEEC databases. Estimates adjusted for pre-trend differences.

Launching a new professional course in a municipality produces an average increase of 0.14 workers in the specific occupation of that course two years after the first cohort graduates, rising to 0.17 workers after three years. The impact seems to grow over time, a trend which seems logical given that additional cohorts of students graduate in subsequent years. Relative to the average employment level in the reference period

15 \The impacts of the expansion of professional course

—defined as one year before graduation — these figures represent an increase of 11% two years after graduation and 14% three years after.

In light of this, and **given the introduction of 4,123 new professional courses[21] linked to professional occupations, we estimate a total counterfactual increase in employment in those occupations of 565 workers two years after graduation, and of 717 three years after graduation**.

However, when these figures are compared to the total number of students in the first cohort at graduation (65,350 students), the estimated employment impact corresponds to just 0.86% two years after graduation and 1.1% after three years. These results highlight the modest overall effect of the new professional courses on employment in the corresponding occupations within the municipality where the course took place.

We repeated the above analysis separately for each NUTS2-2013 region. The results display some heterogeneity across regions. However, as regional datasets become quite small, most of the estimated figures are not statistically significant. Nonetheless, overall, the impacts remain modest, mostly below one additional worker.

We also analysed the impacts when municipalities with high and low population densities are separated. Results indicate a higher impact on employment for municipalities with above-median population density. Also, separating the courses in terms of the number of students at graduation only yielded positive impacts for new courses with larger cohorts. Nevertheless, the impacts are modest in all cases, with impacts never exceeding 0.5 workers.

A possible explanation for the modest impacts on employment is that the analysis focused on employment in the municipality where the course took place. To capture possible spillover effects on employment in other municipalities, we analysed the impacts on employment at the level of the NUTS3-2013 regions (for a total of 23 regions). This allowed us, in part, to capture situations where a student graduates from a course in one municipality and ends up working in the corresponding occupation but in a neighbouring municipality.

The table below presents the average impact of the creation of new professional courses[22] in a specific occupation (4-digit CPP level) in a NUTS3-2013 region on the employment of VET workers associated with that occupation in that region.

**Impact of the creation of the new professional courses on employment (in number of workers) in the corresponding occupation at the NUTS3 level**

| Number of years after graduation | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Impact on the number of workers | -0.40 | 0.92* | 1.50** | 1.84** | 1.85** | 1.76* |
| Impact in % | -4% | 10%* | 16%** | 19%** | 20%** | 19%* |

Notes: The average number of workers across all combinations of NUTS3 and occupations (at the 4-digit CPP) in the year before graduation equals 9.46. Impact in % is calculated in relation to that average. *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Source: authors' calculations based on Tables of Personnel 2002-2022 and DGEEC databases. Estimates adjusted for pre-trend differences.

When analysed this way, the impact rises to an additional 1.5 workers two years after graduation and around 1.8 workers in the following years. Regarding the average number of VET employees in the year before graduation, VET employment increased by 16% two years after graduation and around 20% afterwards.

In terms of the total number of students in the first cohort (15,835), meanwhile, the estimated employment impact corresponds to 10% after two years and 12% afterwards.

These results show **that the impact on employment is more pronounced at the regional level than at the municipal level, suggesting that students often move between neighbouring municipalities for employment**.

The overall impact, however, remains modest. This may reflect a misalignment between the courses students take and the jobs they later enter. Although courses are designed for specific occupations, many graduates work in unrelated or loosely related fields — suggesting that labour market demand does not always align with their training. This implies a gap between the skills provided by VET and those required by employers.

We also repeated our analysis with a broader grouping of professional occupations (using CPP at three digits instead of four).[23] Nevertheless, this analysis did not find a large magnitude of the effects.

These findings further indicate that while VET graduates do enter the labour market, they often do not work in roles directly related to their training. As a result, many may not fully apply the skills acquired during their education. In this context, **VET appears to work well as a pathway into employment. It also plays a significant role in reducing dropout rates and promoting equity. However, it is less effective as a system for consistently delivering occupation-specific skills that match labour market needs**.

In summary, our findings show:

+ A positive but modest impact on employment in targeted occupations:

  · Employment increased in the region, though not always within the municipality where the course took place.
  · After three years, employment grew by 20% in regional labour markets connected to specific VET programmes.

+ A misalignment remains between training and job placement:

  · A high incidence of VET graduates gaining employment outside their specific field of training, pointing to a need for better alignment with labour market needs.

## C. Impact on Business Creation

This section examines how the expansion of professional courses influenced business creation in associated areas of economic activities.[24] Each new professional course was matched with an economic activity.[25] The analysis then goes on to track the yearly formation of new businesses across distinct economic activities based on data from *Sistema de Contas Integradas das Empresas* (Integrated Business Accounts System, SCIE)[26] from 2004 to 2022.[27]

There are two types of business:

+ *Empresas em Nome Individual* (ENI) (sole proprietorship): independent workers or business entities consisting of a single individual, which may be associated with individual entrepreneurs.[28]

+ *Sociedades* (Corporations, incorporated): business entities or companies that are legally recognised and structured according to Portuguese law. These consist of one or more individuals (or other companies) who agree to pursue economic activities together.

The table below presents the overall average impact of introducing a new professional course associated with a specific economic activity at the municipality level.[29] [30] It reports the impact on the rate of creation of new businesses, corporations and ENIs, in the year the first cohort graduates (year 0) and in subsequent years.

**Impact of the rate of creation of new businesses, corporations and ENIs, in the corresponding area of economic activity at the municipality level**

| Number of years after graduation | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Impact on the rate of creation of new corporations | -0.01 | 0.10 | 0.17* | 0.40*** | 0.67*** | 0.62*** |
| Impact in % | 0% | 5% | 8%* | 19%*** | 32%*** | 30%*** |
| Impact on the rate of creation of new ENIs | 0.03 | 0.00 | 0.23* | 0.35** | 0.33*** | 0.30** |
| Impact in % | 1% | 0% | 6%* | 9%** | 9%*** | 8%** |

Notes: The average number of new corporations and ENIs across all combinations of municipalities and economic activities in the year before graduation equals 2.08 and 3.71. Impacts in % are calculated in relation to those averages. *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Source: authors' calculations based on *SCIE* 2004-2022 and DGEEC databases. Pre--trend differences were not significant.

The impact on the rate of creation of new corporations is noticeable only a few years after the first cohort graduates and then gradually increases, rising to an additional 0.67 new businesses per year after four years. This effect represents a 32% increase over the average rate of creation of new corporations of 2.1 per year, which is a substantial effect.

The impact on the rate of creation of new ENIs also takes a couple of years to take effect, peaking at an additional 0.35 ENIs per year after three years have passed. In relative terms, the impacts are less significant when compared with corporations, especially considering that the average rate of creation of new ENIs is 3.7 per year.

This disparity could be explained by the fact that the growing number of vocational graduates with practical, job-ready training especially benefited new corporations actively seeking qualified employees for structured, scalable operations. In contrast, starting a small business requires entrepreneurial skills such as risk-taking and business management, which are typically not covered in vocational curricula. Furthermore, complex regulations, supply chain logistics, the need to build professional networks and high upfront costs present major hurdles to many young graduates, most under the age of 20, trying to successfully launch their own businesses.

Similar to the employment analysis, and to account for the mobility of graduates working in neighbouring municipalities, we extended our

analysis to the NUTS3 regional level. Results appear in the table below.

**Impact of the rate of creation of new businesses, corporations and ENIs, in the corresponding area of economic activity at the NUTS3 level**

| Number of years after graduation | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Impact on the rate of creation of new corporations | -0.23 | 0.45 | -0.01 | 1.72 | 4.12** | 6.12** |
| Impact in % | -2% | 3% | 0% | 11% | 27%** | 39%** |
| Impact on the rate of creation of new ENIs | -0.79 | -3.52 | 0.10 | 3.90** | 2.91** | 3.99*** |
| Impact in % | -2% | -8% | 0% | 9%** | 7%** | 9%*** |

Notes: The average number of new corporations and ENIs across all combinations of NUTS3 and economic activities in the year before graduation equals 15.5 and 42.9. Impacts in % are calculated in relation to those averages. *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Source: authors' calculations based on *SCIE* 2004-2022 and DGEEC databases. Pre--trend differences were not significant.

While expanding the analysis to NUTS3 regions increases the scale of the effects, the relative impact remains similar. As before, the impact on the rate of business creation takes a few years to materialise, but then steadily increases.

In summary, we conclude that:

+ Professional Courses Stimulate Business Creation in Related Sectors: Results suggest a positive impact of the expansion of professional courses on business creation in associated areas of economic activity, indicating a good alignment between the new professional courses and market opportunities.

+ Impact Takes Time to Emerge: The impact emerges gradually and becomes more pronounced a few years after the first cohort graduates. This may reflect the time VET graduates need to gain experience before starting a business, or that new businesses are only viable once there is a sufficiently large pool of specialised workers.

+ Corporations See Stronger Growth: While both types of businesses benefit, corporations show a more substantial and sustained increase than ENIs. This suggests that professional courses may be particularly effective in supporting the creation of more structured or capital--intensive businesses.

# 4. Key Conclusions

+ VET courses accelerate integration into the labour market:
  · 72% of vocational upper secondary education graduates not engaged in further education or training find employment within 1-2 years, compared to only 56% of general education graduates.

+ The expansion of VET courses improved educational outcomes:
  · Secondary school dropout and failure rates dropped dramatically —from 39% in 2000 to under 10% in 2023.
  · Completion rates in upper secondary education increased, particularly among students from lower socio-economic backgrounds.

+ The new professional courses had a positive but modest impact on employment in targeted occupations:
  · Employment in the specific fields related to the professional courses increased across the region in which each new course was launched, although the increase was less pronounced within the specific municipality where the course took place.
  · Three years after implementation, regions that introduced specific professional programmes saw a 20% increase in employment in the targeted occupations.

+ There remains a lack of alignment between training and job placement:
  · Many professional course graduates end up working outside their specific field of training, possibly indicating a need for greater alignment between vocational courses and labour market needs.

+ The expansion of VET courses supported entrepreneurship and business creation:
  · Creation of new businesses rose significantly 3-5 years after VET graduates entered the market.
  · Growth was more prominent in corporations than in sole proprietorships.

# 5. Policy Recommendations

The recent expansion of VET in Portugal has had notable beneficial effects on dropout and failure rates, employment and business creation. There are, however, areas where further policy action is needed to leverage VET's potential fully. By aligning educational offerings with labour market demands, supporting entrepreneurial initiatives and addressing regional disparities, the Portuguese VET system can continue contributing significantly to economic growth and youth employment.

The following recommendations aim to build upon the positive outcomes observed in Portugal's VET expansion while addressing key areas for improvement, ensuring that the system continues to evolve in line with labour market needs and regional challenges.

## 1. Align VET Curricula with Labour Market Needs

**Although VET expansion has improved employment outcomes, many graduates do not enter fields related to their training, revealing a skills misalignment.**

Recommendations:

+ Deepen Industry Partnerships: Establish formal partnerships between VET institutions and employers to co-design curricula tailored to current and emerging skill demands.[31]

+ Promote Work-Based Learning: Strengthen internships and apprenticeships through coordinated efforts between regional authorities and businesses.

+ Simplify Legal Frameworks: Streamline regulations governing apprenticeships to reduce barriers for businesses and encourage school-business collaboration.

+ Improve Career Guidance: Offer robust, evidence-based career services to help students navigate pathways aligned with their skills.

## 2. Foster Regional Coordination through Intermunicipal Planning

High mobility among VET graduates suggests the need for broader regional alignment in course planning.

Recommendations:

+ Coordinate VET Offerings at the Level of the Regional Coordination Commissions: Bring together municipalities, employers and educators to plan course offerings collaboratively based on regional trends.

+ Integrate with Regional Economic Strategies: Align VET planning with broader development goals to improve relevance and efficiency.

+ Share Infrastructure: Enable municipalities to co-invest in shared VET facilities and equipment, especially in low-density areas.

## 3. Expand VET Offerings in Underserved Regions

Funding disparities have left regions like the Lisbon Metropolitan Area and the Algarve with limited VET coverage.

Recommendations:

+ Prioritise Regional Investment: Direct national and EU funds strategically to low-coverage areas.

+ Incentivise Course Creation: Offer financial incentives for opening VET programs in underserved locations, prioritising alignment with local labour needs.

## 4. Ensure Curriculum Balance and Flexibility

While VET graduates fare well in employment, many end up in unrelated fields or seasonal industries.

Recommendations:

+ Blend Academic and Practical Skills: Design curricula that combine core academic competencies with technical training to boost adaptability.

+ Prepare for Seasonality: Fields like tourism and agriculture should incorporate transferable skills to support year-round employability.

+ Promote Cross-Disciplinary Learning: Encourage teaching methods that connect vocational skills with general education subjects.

+ Regularly Update Course Content: Incorporate developments in digital skills and industry innovation on an ongoing basis, especially in light of the labour market changes driven by automation and AI.[32]

## 5. Promote Entrepreneurship Through VET

VET programmes positively impact business creation, especially corporations. However, their effect on the creation of sole proprietorships (ENIs) is notably smaller.

Recommendations:

+ Incorporate Entrepreneurial Training: Include modules on business development, innovation and self-employment within all VET programmes.

+ Support Startups by VET Graduates: Offer mentoring, seed funding and incubator access to help graduates start businesses aligned with their training.

+ Simplify Bureaucracy and Guidance: Create VET-based support desks to help graduates navigate the process of registering as an ENI and accessing relevant tax or social security regimes.

+ Networking & Visibility: Organise local fairs or marketplaces where VET graduates can showcase their services or products, helping them build visibility and connect with potential clients.

## 6. Elevate the Public Image of VET

Despite strong outcomes, VET still suffers from perception challenges.

Recommendations:

+ Highlight Success Stories: Publicise graduate achievements in employment and entrepreneurship through campaigns and media.

+ Secure Industry Recognition: Partner with employers to formally endorse VET credentials, promoting parity with academic degrees.

## 7. Monitor and Evaluate VET Impact

Ongoing assessment is essential to keep VET responsive and effective.

Recommendations:

+ Develop Strong Evaluation Frameworks: Track course effectiveness using indicators like employment rates, income, and entrepreneurial outcomes.

+ Leverage Integrated Data Systems: Use INE databases to build longitudinal profiles of graduates and refine policies accordingly.

+ Strengthen Existing Platforms for Anticipating Needs with New Data Sources: Enrich databases using online job platforms and high-frequency labour market data to improve forecasting and course relevance.

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# 7. Notes

1 The organisation of VET courses also varies across the EU27 countries. According to Eurydice data for the 2024/2025 academic year, 23 countries offer school-based programmes, while 17 offer combined school- and work-based programmes. Some countries have both types of offers. Portugal only offers school--based programmes. Source: link.

2 Portugal's 2020 Human Capital Operational Programme (POCH) was the primary European funding programme during the period 2014-2023. It was approved by the European Commission Decision of 12 December 2014. Support for professional courses in the period amounted to €2,455 million (€2,086 million from the European Social Fund), constituting 93% of the programme funds for youth education (source: link). This programme was preceded by QREN from 2007 to 2013 and will be succeeded by the Portugal 2030 programme. There is also an ongoing programme for creating 365 specialised technological centres, which will re-equip and strengthen the technological infrastructure of education establishments, with a total budget of €480 million financed by the national Recovery and Resilience Plan (PRR). Source: link.

3 According to Ferreira & Martins (2023), the expansion of VET courses in Portugal significantly boosted upper secondary graduation rates, raising the likelihood of graduating by over 50% for certain students, particularly those with low-achieving backgrounds, from households receiving welfare or with lower levels of parental schooling.

4 Source: OECD, Education at a Glance 2024.

5 These figures represent the employment share among all recent graduates from upper secondary or post--secondary non-tertiary education, not in formal education or training and aged 15-34 at graduation. Source: OECD, Education at a Glance 2024.

6 Using data from *Quadros de Pessoal* (Tables of Personnel) up to 2013, Hartog et al. (2022) find that for workers with upper secondary education, there was a gradual narrowing of the wage gap between those who pursued general tracks and those who followed VET programmes: at age 30, the general education wage premium is 7.7% for the cohort born in 1962-1967, 7.1% for the 1968-1970 cohort, 4.2% for the 1971-1979 cohort and 0.4% for the 1980-1995 cohort (ages 18 and 40 present a similar pattern). The negative value for the most recent cohort indicates that VET graduates are now earning higher wages than their peers from general education. Ferreira & Martins (2023), also using Tables of Personnel data until 2013, corroborate the evidence that the newer cohorts of VET graduates enjoyed a small wage premium (0.3%--0.7%) compared to the general education graduates.

7 An overview of these courses appears here.

8 The curriculum is currently defined by Decree--Law no. 55/2018, of July 6. Sociocultural subjects (1000 hours): *Português* (Portuguese), *Língua Estrangeira* (Foreign Languages), *Área de Integração* (Integration Area, a multidisciplinary course), *Tecnologias de Informação e Comunicação/Oferta de Escola* (Information and Communication Technology/ School Offering), *Educação Física* (Physical Education); Scientific subjects (500 hours): 2-3 courses (some examples: *Biologia* (Biology), *Química* (Chemistry), *Economia* (Economics), *Geografia* (Geography), *História da Cultura e das Artes* (Art and Cultural History), *Psicologia* (Psychology), *Matemática* (Maths); Technological training (between 1000 and 1300 hours): short-term modules specifically created for each professional course; and on-job-training (typically 600 hours, up to 840 hours).

9 The other VET courses are *cursos de aprendizagem* (apprenticeship courses), *cursos artísticos especializados* (specialised artistic courses), and *cursos com planos próprios* (specific curriculum courses).

10 This count reflects the first-time offering of courses linked to specific professions based on the *Classificação Portuguesa das Profissões* (Portuguese Classification of Occupations, CPP) — at 4 digits in each municipality. Source: "*Ensino secundário — Alunos matriculados, por ano letivo, oferta de educação e formação e idade/grupo etário*" (Secondary education — Pupils enrolled, by school year, education and training offer and age/age group), databases and administrative data from DGEEC.

11 "*Áreas de Educação e Formação*" (Education and Training Areas) according to the *Classificação Nacional de Áreas de Educação e Formação* (National Classification of Education and Training Areas, CNAEF) — Portaria n.º 256/2005, de 16 de março (Ministerial Order no. 256/2005, of 16 March).

12 The graph shows the number of times a professional course linked to a specific profession was introduced for the first time in a municipality in each academic year.

13 We follow the staggered difference-in-differences methodology described in Callaway & Sant'Anna (2021).

14 We also expanded the control group to include municipalities and sectors where a new course was introduced later but had not yet started. This change had little effect on the results, which remained very similar.

15 When pre-existing trends differ between the groups — up to six years prior to the graduation year — we adjust the difference-in-differences estimates using the methodology proposed by Rambachan & Roth (2023).

16 Each new professional course is linked to a specific occupation — we use the CPP at 4 digits.

17 The matching with professional courses was made using data obtained from *Agência Nacional para a Qualificação e o Ensino Profissional* (National Agency for Qualification and Vocational Education, ANQEP) under the scope of the *Sistema de Antecipação de Necessidades de Qualificação (*Qualification Needs Anticipation System, SANQ). This system provides guidance for the network of training supply and the *Catálogo Nacional de Qualificações* (National Qualifications Catalogue, CNQ).

18 The Tables of Personnel dataset is provided by Statistics Portugal (INE). It is a comprehensive longitudinal database with detailed information about all businesses, establishments and their employees in Portugal. It includes the employees' occupations (CPP-4 digits) and educational qualifications. It also has information on the industry and municipality of each establishment. This database does not include the public administration, nor self-employed or independent workers.

19 The results regarding the impact on employment are based on all municipalities in mainland Portugal except Lisbon, Porto and Braga, as these are associated with some outlying numbers. Moreover, it is likely that spillover effects to other municipalities prevent our analysis from capturing a large fraction of the impacts of the creation of new courses in these large municipalities. Nevertheless, when the analysis factors in the full set of municipalities, the results are very similar in terms of the estimated impacts in relative terms, statistical significance, and main conclusions.

20 It shows the impact on employment in the years after the first time a course linked to a specific profession is offered in a municipality.

21 This number is below the total number of new courses due to the exclusion of 3 municipalities and because there were 76 new courses that did not match any specific occupation in Tables of Personnel.

22 There are now 1,017 new professional courses at this level of aggregation.

23 For example, physical and chemical science technicians (code 3111) and civil engineering technicians (3112), both belong to the broader group of Physical Science and Engineering Technicians (code 311).

24 We use the *Classificação Portuguesa das Atividades Económicas* (Portuguese Classification of Economic Activities, CAE), a system of numerical codes that identifies and classifies economic activities.

25 We were able to match the professional occupation of 728 new professional courses to an economic activity in the 4-digit CAE.

26 SCIE is a longitudinal database that registers companies' detailed information. The dataset is provided by Statistics Portugal (*Instituto Nacional de Estatística*).

27 As in the case of employment, the municipalities of Lisboa, Porto and Braga are not included in this analysis. The results when including these municipalities were similar in terms of relative impacts, statistical significance, and main conclusions.

28 The term ENI includes both *trabalhadores independentes* (self-employed workers) and *empresários em nome individual* (sole proprietor). An "*empresário em nome individual*" is the sole proprietor who operates a business under their own name, assuming full personal responsibility for all business activities, profits and liabilities. This means the individual is directly accountable for the business's financial obligations and operational outcomes.

29 It captures the effect on the annual rate of new business creation in the years following the first time a course linked to a specific profession is offered in a municipality.

30 Unlike the Tables of Personnel database, information in SCIE is at the business level, not at the establishment-level. The location of each business corresponds to its headquarters. This is a limitation in terms of an accurate location for new business with establishments in different municipalities.

31 Examples: "Ser Pro" (Be Pro) by *Iniciativa Educação* (Education Initiative); "Rede de Parceiros de Excelência para a Aprendizagem (Network of Excellence Partners for Learning)" by *Instituto do Emprego e Formação Profissional* (Institute for Employment and Vocational Training, IEFP); "programa PRO_MOV"(PRO_MOV programme).

32 Fundação Francisco Manuel dos Santos (2025), "Automation and Artificial Intelligence in the Portuguese Labour Market: Challenges and Opportunities," Policy Paper.

## Pedro S. Martins

Pedro S. Martins is a Full Professor at Nova School of Business and Economics. He obtained his PhD in 2005 from the University of Warwick. He is currently Co-Director of the Nova School of Business and Economics Public Policy Institute, Director of the Economics for Policy Knowledge Centre and a member of the Economics of Education Knowledge Centre at Nova School of Business and Economics. He is also Chair of the Scientific Council of the Association of Entrepreneurs for Social Inclusion and an external evaluator for the Education Initiative. He is currently working on a study on "Vocational Education, Higher Education and the Labour Market: An Analysis of Cross-Referenced Individual Data" for PLANAPP – Centre for Planning and Evaluation of Public Policies – and the Foundation for Science and Education. He has published various articles in international academic journals in the fields of labour economics and the economics of education.

## Luís Catela Nunes

Luís Catela Nunes holds a PhD in Economics from the University of Illinois at Urbana-Champaign, USA. He is a Full Professor at Nova School of Business and Economics, where he served as Chair of the Pedagogical Council, Deputy Director for Research and Coordinator of its research unit. He is currently a member of the advisory board of EDULOG — an educational think tank from the Fundação Belmiro de Azevedo —, as well as Co-Scientific Director of the Economics of Education Knowledge Centre at Nova School of Business and Economics, where he has coordinated several projects, including "Does Grade Retention Help?," "The Impact of Teachers on Student Learning," "Inclusion and Discrimination of Immigrant Students" and "Diagnosis of Teaching Needs." His research has been published in several international scientific journals.

## Pedro Reis

Pedro Reis holds bachelor's and master's degrees in economics from Nova School of Business and Economics. He is also Visiting Assistant Professor at Nova School of Business and Economics, where he teaches macroeconomics and has previously taught Introduction to Microeconomics. He is also a Research Assistant at the Economics of Education Knowledge Centre at Nova School of Business and Economics, as part of the study on "The Economic Returns of Education." In addition to economics, he has a keen interest in history, politics and literature.

## Teresa Thomas

Teresa Thomas is a Research Assistant at the Economics of Education Knowledge Centre at Nova School of Business and Economics. She holds bachelor's and master's degrees in economics from Nova School of Business and Economics, where she has played a decisive role in the school's economics clubs and think tanks, collaborating on various research and writing projects. She is currently part of the FFMS study team on "The Economic Returns of Education," coordinated by Luís Catela Nunes.

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