Measuring and analyzing student perceptions on earnings and the labor market

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Abstract: This study investigates students' perceptions of the economic and non-economic returns to higher education, utilizing the analytical framework of human capital theory but also combining insights from behavioural economics. Using survey data from Greek undergraduates, the analysis measures perceived age–earnings profiles, employability expectations, and other qualitative benefits of education. Results show that students display strong optimism regarding the financial rewards of higher education, with an average perceived internal rate of return (IRR) of about 10%; higher than actual market estimates. Women report lower expected lifetime earnings than women, indicating internalization of gendered labour-market inequalities. Beyond pecuniary gains, students also expect faster job acquisition, stable full-time employment, and strong job–study relevance; all non-pecuniary rewards associated with higher education. Overall, the findings highlight that students perceive university education not only as a profitable investment but also as a source of professional fulfilment.

Keywords: perceived returns to education, internal rate of return, non-pecuniary benefits, gender differences, employability, behavioural economics**.**

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1. Introduction

Human capital theory posits that educational choices result from meticulous calculations of the benefits and costs of different educational paths, leading individuals to select the option that maximizes their lifetime economic welfare (Schultz, 1963; Becker, 1964; Ben-Porath, 1967). Solidly grounded in rational choice assumptions and the operation of competitive markets, this framework has yielded important insights into the economic dimensions of education. The most influential applications of this theoretical line were the empirical contributions of Mincer (1974) and Psacharopoulos (1985) who translated these theoretical premises into measurable outcomes, estimating how additional years of schooling are associated with higher earnings and productivity.

Despite its explanatory power, the reliance of human capital theory on assumptions of rationality has been the subject of strong criticisms. In real-life scenarios, individuals (i.e. students in our context) rarely possess complete information about the costs and the typically long-term benefits of education. Not only are their decisions often taken under a veil of uncertainty about future benefits and present costs, but also are shaped by limited cognitive capacity, emotional factors, and social pressure. Drawing on modern advances in behavioral economics, it is widely acceptable that most people use various simplified decision-making strategies to make choices under uncertainty or risk. These “bounded” choices may be completely understandable when seen from individuals’ perspective, that is, they are rational within certain limits, but potentially suboptimal in objective economic terms (Simon, 1957). To provide a concrete example, Kahneman & Tversky

(1979) prospect theory demonstrates that people are psychologically more sensitive to losses than to equivalent gains. Under prospect theory, a parent might avoid paying tuition for a good school even if it offers significant long-term benefits, because the immediate financial loss feels more painful than the potential future gain in career outcomes. Overall, these behavioural critiques to rationality axions have shifted attention from purely economic calculations of benefits and costs to the psychological and contextual processes underlying educational decision-making.

Educational decisions are especially prone to behavioural biases because they involve high uncertainty, long-term consequences, and emotionally weighted trade-offs between effort, cost, and future reward. Unlike simple consumer choices, education decisions often require individuals to process complex and incomplete information about abilities, school quality, far reaching labour-market prospects, and social expectations. It is very possible that this cognitive and emotional overload makes people rely on heuristics, perceptions and emotions rather than rational cost–benefit analysis as is hypothesized by human capital theory for reasons of abstraction. Fundamentally, the costs of education (e.g. tuition fees, opportunity costs) arise in the present, while the benefits of education arise in the future and are difficult to calculate. The benefits of education also consist of pecuniary and non-pecuniary rewards, with the latter being very demanding to evaluate in monetary terms. These asymmetries between benefits and costs may give rise to all kind of behavioral and cognitive biases, leading to student behaviours such as status quo biases (sticking with familiar options), loss aversion as predicted by Kahneman's prospect theory (overvaluing immediate costs), present biases (preferring short-term comfort over painful long-term gains), etc. All the above imply that the future benefits of education are not only "expected", that is objectively predicted based on models, probabilities and past evidence, but also "perceived", that is influenced by individual's beliefs, fear and hopes. Therefore, it is sensible to assume that individuals taking educational choices are not only constrained by information asymmetries (which is a problem relatively easy to remedy; just provide information to all prospective students), but also by social influences and behavioral biases.

The acknowledgement of social influence in educational choices is not something new. The sociology of education has long emphasised that decisions about schooling are embedded in social structures, shaped by class background and cultural capital and student and parental expectations transmitted through families, peers, and institutions (Bourdieu & Passeron, 1977; Bernstein, 1990; 1996). The repercussions for educational inequality cannot be underestimated. If educational choices are shaped by multiple factors acting at the individual, family, community and school level, this means that decisions are not influenced only by an objective reality but also by the perception of reality which is clearly context-dependent and thus potentially flawed, biased, overoptimistic or unduly pessimistic, leading students to trajectories that do not necessarily align with their abilities, interests or the actual opportunities available in the educational and labor market. For example, students from low-income families may avoid higher education because they are more sensitive to financial sacrifice (irrespectively if they can incur such sacrifice). This is a completely different problem than the liquidity constraint problem outlined by human capital theory (Checchi, 2006). High achieving students in poor rural areas may refrain from applying to elite universities due to status quo bias or simply a lack of confidence regarding their social fit ("this is not for me" mentality). Some students may be attracted to popular fields such as law or business administration believing these careers are always prestigious and lucrative due to their high visibility and way of (mis)representation in the media. Students may have adequate information but still may interpret it or use it in a distorted way due to cognitive biases, social norms or emotions. In such an example, a female student may be aware that pilots are well paid but avoid such career because "piloting planes is a men's job". Suffice to say that the intersection of incomplete information and false perceptions may cause even worse distortions in judgment.

Perceptions of educational returns are especially critical in explaining educational inequalities and how they transform later to income inequalities (Boneva et al, 2022). Disadvantaged groups may systematically underestimate the benefits or overestimate the risks of education, due to subtle structural constraints such as the absence of suitable role models in their community or due to family-infused predispositions (Bourdieu & Passeron, 1977). This may lead to underinvestment in schooling, even in cases that objective returns are high. Addressing these perception biases

through provision of information, guidance and targeted policy interventions might be a crucial step for promoting equal opportunities in education.

Within this context, the aim of this paper is to demonstrate the methodological steps for defining, measuring and analyzing the perceptions of students about the labour market, placing emphasis on the pecuniary benefits of education (that is the perceived economic returns to education). The emphasis on the pecuniary benefits of education does not mean that non-pecuniary benefits are not important. On the contrary, non-pecuniary benefits constitute the essence of education viewed as a process of human development, citizenship, and personal flourishing. Yet, they are difficult to meaningfully measure them and incorporate them into economic modelling. The remainder of the paper is structured as follows. Section 2 outlines the conceptual and theoretical foundations of economic returns to education, distinguishing between actual and perceived returns. Section 3 presents the methodological approach for estimating perceived returns, including the design of the research instrument. Section 4 applies this methodological approach to real data derived from a sample of undergraduate students in Greek universities. The last section concludes by providing some clear pathways to future research.

2. Theoretical and conceptual considerations

2.1 Standard human capital theory

The core idea of human capital theory is that expenditure on education should not be viewed as consumption but as an investment, i.e. a process of sacrificing consumption today in the prospect of economic gains in the future. The seeds of human capital theory can be traced back to classical economists such as Alfred Marshall and Adam Smith and much later to Milton Friedman. The following excerpt from Adam Smith's Wealth of Nation, Chapter X, is very illuminating, essentially paving the way for the modern human capital theory:

> "*When any expensive machine is erected, the extraordinary work to be performed by it before it is worn out, it must be expected, will replace the capital laid out upon it, with at least the ordinary profits. A man educated at the expense of much labour and time to any of those employments which require extraordinary dexterity and skill, may be*

compared to one of those expensive machines. The work which he learns to perform, it must be expected, over and above the usual wages of common labour, will replace to him the whole expense of his education, with at least the ordinary profits of an equally valuable capital. It must do this, too, in a reasonable time, regard being had to the very uncertain duration of human life, in the same manner as to the more certain duration of the machine"

(An Inquiry into the Nature and Causes of the Wealth of Nations, Book I, Chapter X "Of Wages and Profit in the different Employments of Labour and Stock, Part I: Inequalities arising from the nature of the employments themselves").

Smith's analogy between the skilled worker and an "expensive machine" introduces a profoundly modern idea: education and training are forms of capital formation; human capital. Human capital is construed to include all the knowledge, skills, attitudes, and traits that are useful in the production of goods and services. If all these human skills and traits are useful in production, then they should possess some economic value, which can be measured and compared to other returns. His insight that education should "*replace the capital laid out upon it, with at least the ordinary profits*" essentially encapsulates the economic rationale of what later became modern human capital theory. Simply put, education, like any form of capital, must generate a sufficient return to compensate for its initial cost (tuition fees, etc.) and provide a profit comparable to alternative investments and it is this condition that renders educational investment economically rational.

Much later, in the mid-twentieth century, the concept of human capital was revived and systematized by Milton Friedman, Theodore Schultz and Gary Becker, who established the analytical foundations for conceptualizing education as a process of capital formation in which individuals and societies indulge with the expectation of future returns.

Milton Friedman was the first modern economist to conceptualize professional education explicitly as a form of investment in human capital. In his 1955 essay "The Role of Government in Education", Friedman introduced the idea that education is an investment in human capital because it increases individuals' productivity and future earnings. He argued that individuals (and

society) invest in education expecting economic returns. An immediate policy implication of this thought was investment in education should be mostly guided by market principles rather than state monopolies. Theodore Schultz and Gary Becker advanced the idea further. Schultz (1963) highlighted the macroeconomic importance of human capital for growth and poverty reduction (and indeed he was very influential in international policymaking). In his influential works, Schultz argued that investment in people (including education, health, on-the-job training and migration) is essential to economic growth as is investment in physical capital. He showed that much of postwar economic expansion could not be explained by increases in land, labour, or physical capital alone (this is the so called "residual" in growth literature), but by improvements in the quality of labour, that is in human capital.

Becker (1964) focused on the microeconomic mechanisms linking education to higher wages. In that way, human capital theory was transformed from a concept into a formal mathematical economic model, and economists started to analyze education, training and skill acquisition using the same methodological principles as any other investment decision within a single coherent framework.

Special merit should also be given to Jacob Mincer (1974), who operationalised Becker's human capital theory and essentially provided the econometric foundation for decades of research on inequality, labour markets, and educational policy. The aim of the "Mincer earnings function" is to quantify the effect of years of schooling on wages, establishing the basis of modern economics of education and labour market analysis. Suffice to say that by providing a measurable link between education and income, Mincer's framework offered powerful empirical arguments for public investment in education and for policies promoting equal access to schooling.

The core tenet of the human capital theory is that individuals behave rationally. Economic rationality assumes that individuals:

- Have clear (well defined) preferences among available choices.
- Seek relevant information about costs, benefits and probabilities attached to different costs and benefits.

- Compare alternatives in a logical manner[1].
- Choose the option that maximizes their expected utility.

In short, rational individuals choose the course of action that best serves their interests, subject to budget constraints (including time and information in the definition of resources).

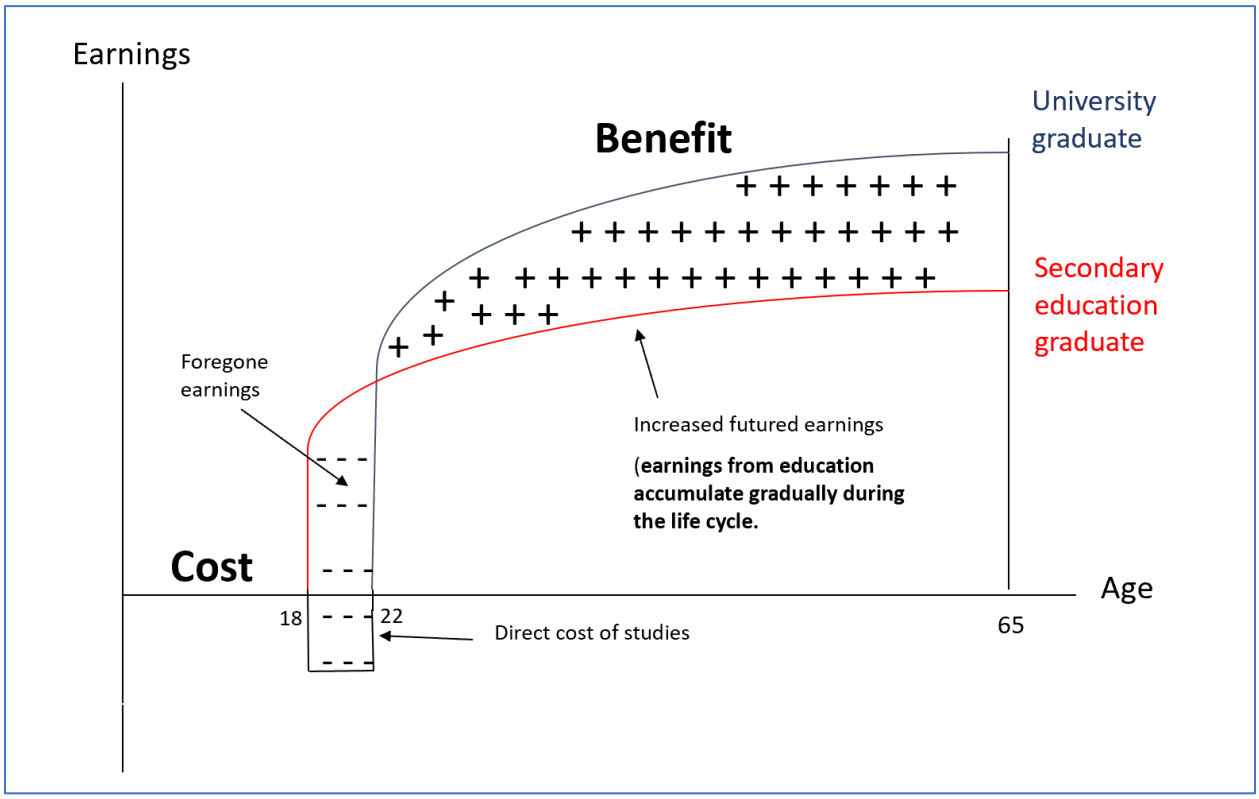
In the context of education, a student deciding whether to pursue tertiary education should initially account for the cost of education: estimate tuition fees and living expenses (direct costs) and foregone income from not working during studies (this is the indirect cost or opportunity cost). Thereafter, the student should predict the benefit of education (potential salary gains and job opportunities after graduation. The benefits accrue across time and this means that they should be discounted to calculate their present value. If the discounted benefits do not at least cover the costs, the logical choice, under the assumption of economic rationality, is to not study and instead to enter the labour market.

Figure 1 provides a schematic representation of the decision-making process described above. The black line depicts a hypothetical age - income profile for an individual who completes tertiary education, while the red line represents a secondary-education graduate who enters the labour market immediately after finishing school. The secondary-education graduate begins earning income earlier in life, yet her earnings trajectory tends to be lower and flatter over the life course. In contrast, university graduates enter the labour market later, after several years devoted to study and skill acquisition. This delayed entry has an economic cost, since it implies the loss of potential income that could have been earned during the study period. Such foregone earnings constitute the indirect costs of tertiary education. At the same time, university studies usually involve direct monetary expenses, including tuition fees, books, accommodation, and other educational outlays. These direct and indirect costs together represent the investment component of higher education, which individuals compare against the expected future benefits; namely, the higher lifetime earnings and improved employment prospects associated with tertiary education.

[1] Logically means here that they evaluate each available option according to a clear and consistent criteria.

The individual undertakes a cost–benefit analysis to compare these two alternatives. The area (––) represents the total costs of higher education, whereas the area (++) indicates the future benefits; namely, the additional income associated with higher productivity and employability. If the value of the benefits exceeds the costs, then investing in university education is economically rational. The same analytical framework can be extended to compare alternative fields or types of tertiary studies, allowing the individual to select the option yielding the highest expected return. The figure as it stands assumes a zero-discount rate and thus the present value of the benefit is equal to the nominal value. This is for reasons of simplicity. Of course, the discount rate is positive and the area (++) is less than it appears in the graph. The higher the discount rate the less the present value of the benefit. This point will be discussed later.

Figure 1: Age income profiles of graduates and cost benefit analysis of educational choices



The human capital analytical framework assumes that students can make long-term utility-maximizing decisions in a consistent way. They possess relatively stable preferences, have access

to all the relevant information, and, finally, they have developed the ability to make consistent decisions to maximize their personal economic well-being. However, as we discussed earlier in the introduction, in the real world, educational decisions might be shaped by uncertainty, social norms, family background, predispositions and structural inequalities. Furthermore, education is not always pursued for purely instrumental reasons: many individuals value learning for its intrinsic, intellectual, or social rewards, irrespective of financial returns. Recognizing these limitations highlights the need for empirical investigation into how educational choices are actually made and how perceptions about educational benefits influence students' decision-making processes.

Despite these apparent limitations, human capital theory has proved very influential in policymaking and academic analyses. The basic insight that education has costs but also yields measurable economic returns has proven empirically valid and pivotal for understanding wage differentials, labour productivity, and economic growth. The available empirical evidence consistently supports that education tends to raise earnings and productivity on average. By far the most persuasive empirical proof of human capital research is provided by David Card (1999), who addressed the long-standing issue of whether the positive association between education and earnings is correlative or causative. Exploiting exogenous sources of variation in educational attainment, Card was able to isolate the causal impact of schooling on wages. His findings demonstrated that the real average return to education is not much different than the estimates derived from a standard Mincer function fit by a simple OLS model. This means that education has a genuine productivity-enhancing effect and that there is a causal relationship between education and income as assumed by Becker, Schultz and Friedman and intuitively recognized by millions of parents worldwide who continue to invest in their children's education despite being unaware of all these academic nuances.

Strengthening the case for education by showing that the wage - schooling relationship is not merely a correlation has also reinvigorated the policy importance of investing in schooling, vocational training, and lifelong learning. At the macroeconomic level, human capital accumulation is a standard pillar of growth models, with international organizations using it to guide strategies for poverty reduction and inclusive development. Furthermore, influential

international organisations, such as the OECD, have broadened the concept of human capital to encompass concepts of health and well-being. More recently, the human capital theory has also been employed to understand the importance of digital skills and non-cognitive abilities in the era of artificial intelligence and automation (Heckman, 2017; OECD, 2018). Finally, it underpins debates in social policy, inequality, and migration, where human capital frameworks are used to design strategies for reskilling, upskilling and understanding migratory flows.

2.2 Estimation of the economic return to education

One of the first endeavors of the human capital scholars was to find ways to quantify the economic returns to education. The idea was to quantify the increase in earnings attributable to an additional year or level of schooling, under the assumption that education enhances individuals' productivity. Quantifying the economic return to education was an essential in the development of human capital theory because it transformed a theoretical idea, that education pays off, into a measurable and empirically testable proposition. It was also pivotal in linking individual incentives (why to educate?), social equity (why to lift people from poverty?), and macroeconomic development (how modern knowledge economies grow) under a single analytical framework. Eventually, two methodological approaches dominated the literature. The first is the so-called elaborate method or full discounting method, the second is the Mincerian earnings functions (Psacharopoulos, 1994).

The elaborate method or full discounting method

The elaborate method is based on calculating the internal rate of return to education using age-earnings profiles. In finance, the internal rate of return (IRR) is the discount rate that makes the net present value (NPV) of an investment equal to zero. Algebraically, it is the rate r that satisfies:

$$(1)\ \sum_{t=0}^{n} \frac{B_t - C_t}{(1+r)^t} = 0$$

Where B_t represents the cash inflows in period t and C_t represents the cash outflows. The IRR is the rate of return at which the present value of future benefits exactly equals the present value of costs. The IRR is a core metric for evaluating the profitability of an investment project, the rule

is that if IRR of an investment project is higher than the cost of capital then the project is profitable and vice versa.

Applying the concept of IRR in education decision-making we get the following expression (Psacharopoulos, 1994):

$$(2)\ \sum_{t=m+1}^{n} \frac{(W_u - W_s)_t}{(1+r)^t} = \sum_{t=1}^{m} (W_s + C_u)(1+r)^t$$

In the above equation:

Wu is the annual earnings of a person getting u level of education (suppose the higher level).

Ws is the annual earnings of a person getting s level of education (suppose the lower level).

It follows that $(W_u - W_s)_t$ is the benefit of attaining the higher level of education (e.g. university studies vs secondary school).

C_u is the direct cost of studies. The letter m represents the number of years needed to get the extra education (for example four in the case of university studies). Thus, the right hand expression represents the cost of education, including direct and indirect costs.

Solving the equation for r will give the internal rate of return.

The informational demands for calculating IRR require data on age - earnings profiles for both educational paths. For example, average or median annual earnings of university graduates at each age t and the corresponding earnings for secondary school graduates. Possible data sources for age-earnings profiles are Labour Force Surveys, longitudinal wage datasets, administrative tax records or in general large-scale household income surveys. Information on direct educational costs (tuition fees, educational material, cost of accommodation, etc.) is also needed. As regards the foregone earnings, the typical choice is to equal them with the expected earnings of a secondary-school graduate during study years.

The Mincerian wage equation

A more popular approach for estimating the rate of return of education is the Mincerian wage equation Mincer (1974). Mincer proposed a parsimonious econometric framework linking individual's earnings to their schooling and work experience. The model is grounded in human capital theory and assumes that individuals invest in education and on-the-job training to enhance their productivity, which is subsequently reflected in higher wages.

In its simple form, the Mincerian wage function is expressed as follows:

$$(3)\ \ln W_i = \beta_o + \beta_1 S_i + \beta_2 E_i + \beta_3 E_i^2 + \varepsilon_i$$

Where:

W_i represents the wage of individual i.

S_i represents the years of schooling for individual i.

E_i is labour market experience (usually proxied by age – years of schooling – 6).

E_i^2 captures the nonlinear effect of experience (wages rise with experience, but at a decreasing rate).

ε_i represents a disturbance term for individual i.

The coefficient β_1 is the rate of return to education. The coefficients of the Mincerian equation have a semi-elasticity interpretation and measure the percentage change in wage for a unit increase in the corresponding independent variable. Thus, β_1 is the percentage change in wage for an additional year of schooling and this magnitude can be interpreted as the economic rate of return to education.

An alternative (but equivalent) specification is the following:

$$(4)\ \ln(w_i) = \beta_o + \beta_1 SEC_i + \beta_2 UNI_i + \beta_3 E_i + \beta_4 E_i^2 + \varepsilon_i$$

In the latter function, SEC stands for secondary education, UNI stands for university education. Less than secondary is the reference group.

In this specification, the return to schooling for someone having completed secondary education is:

$$(5)\ r_{sec} = \frac{\beta_1}{S_{sec}}$$

Where S_{sec} is the total number of years of schooling for those who have completed secondary education (i.e. 12 years).

The return to tertiary education is:

$$(6)\ r_{sec} = \frac{\beta_2 - \beta_1}{S_{UNI} - S_{SEC}}$$

Another popular specification is the augmented Mincerian function. The idea here is to add covariates for demographic characteristics (such as gender) in the typical Mincerian function. The purpose of adding variables is to increase the model's ability to explain wage differentials across individuals and groups, yielding more realistic estimates or even reducing omitted variable bias which may bias estimates derived from the simple model.

Mincer also showed that under several simplifying assumptions such as perfect competition in the labour market (ensures that wages reflect productivity), equal direct costs of education across individuals, constant returns per year of study, parallel age – earnings profile and no observed ability bias the estimated OLS coefficient can be interpreted as an approximation of IRR.

Identification issues

An empirical challenge regards the isolation of the causal effect of education on wages from other confounding factors. Several studies have shown that accounting for endogeneity influences the estimated return to education compared to a simple OLS model. The first source of bias could be the endogeneity of education choices: individuals' schooling decisions may be influenced by unobserved characteristics such as ability, motivation, or family background, which also affect earnings. To address this, an estimation strategy is to employ an Instrumental Variables (IV) approach using two-stage least squares (2SLS). A typical instrument is to use parental education. Parental education is correlated with individuals' educational attainment but can be assumed not to directly affect wages. Of course, more nuanced instruments can be utilized if this feasible such

as policy-induced or geographic variations that affect schooling decisions independently of ability (e.g. Oreopoulos, 2006).

A second identification issue concerns sample selection bias, which may arise when observed wages are derived from individuals participating in paid employment; potentially a non-random subset of the population. For example, women with lower expected wages may be less likely to work, causing estimates based solely on employed individuals to be upwardly biased. To correct this, a standard approach in the literature is to use Heckman's (1979) two-step procedure, which models the probability of labour-market participation using a probit selection equation and introduces the inverse Mills ratio as a correction term in the wage regression. Both issues can be treated simultaneously using Wooldridge's (2002) approach to jointly address both endogeneity and selection bias by combining IV and Heckman corrections (the IV-Heckman model). This dual correction improves identification by ensuring that education is instrumented while controlling for non-random participation in employment. Finally, robustness checks (e.g. using alternative estimators) and plausibly exogenous bounds (Conley et al., 2012) may help to further validate that the estimated returns are not the product of weak instruments or model specification. In sum, addressing identification problems in Mincerian functions may be dealt to a certain degree with several econometric strategies that combine valid instruments, selection corrections, and robustness diagnostics.

2.3 Actual economic returns to education: what students can really expect from the labour market?

Applying the methodologies presented in section 2.2, human capital analysts were able to quantify the economic returns to education. Thus, a large volume of empirical research was devoted to measuring returns to education and answering the fundamental question: what is the impact of an additional year of schooling on earnings? One of the most recent and comprehensive studies on the economic returns to schooling is Montenegro and Patrinos (2021). Montenegro and Patrinos (2021) use a harmonized database of private returns to schooling based on 853 household surveys covering 142 countries over the period 1970 to 2014. The distinct advantage of this study is the use of a consistent methodology to estimate the returns to education.

The overarching finding Montenegro and Patrinos (2021) is that average global private return to an additional year of education **amounts to about 10.0%**. Expectedly, large variations exist across regions, gender, socioeconomic status, and level of education.

With respect to gender, women's estimated returns (11.6%) exceed those of men (9.6%), a pattern consistently observed in the empirical literature (Patrinos, 2008). From an economic perspective, the higher marginal returns for women suggest that education enhances productivity and employability more strongly among women, particularly in contexts where female participation is constrained by social norms or limited access to formal employment. Education therefore serves as an equalizing force, enabling women to enter better-paid, more stable, and higher-status occupations than otherwise. But as the gender wage gap literature has consistently shown, women's higher estimated returns do not translate into higher absolute earnings (e.g. Blau and Kahn, 2017). Rather, this return differential reflects the fact that education is an important mechanism that partly offsets systemic disadvantages such as differences in gender roles and the gender division of labor and deeply entrenched labour market stereotypes.

The economic returns also differ among education levels. Montenegro and Patrinos report the following global returns:

- Tertiary education (15.1%)
- Secondary education (7.4%)
- Primary education (11.0%)

This pattern is very typical. Primary education is associated with relatively high rates. This should not surprise us. Being illiterate in the modern world is a major disadvantage, while basic literacy and numeracy skills are fundamental and their economic importance is even higher in developing countries whereas the return to primary education is even higher than in developed countries. In these countries, even basic literacy allows workers to shift from subsistence labour to more productive wage employment. Economic returns often 'flatten' in general secondary schooling due to credential inflation (secondary education has become nearly universal in many countries, reducing its scarcity value). Yet, in some countries vocational secondary education can bring good payoffs in certain sectors (Bishop and Mane, 2004). Besides that, secondary schooling acts as a

bridge with its value derived partly in enabling entry to tertiary education rather than producing strong labour-market returns on its own.

Tertiary education yields the highest private returns worldwide, averaging about 15%, but reaching over 20% in some regions. These high returns reflect the growing demand for advanced, analytical, and digital skills in knowledge-intensive economies, where higher education enhances access to managerial and professional occupations. Despite the expansion of university enrolment, the supply of highly educated labour remains limited relative to demand, sustaining wage premia. Moreover, tertiary qualifications often act as signals of ability and persistence, further reinforcing their market value. Together, these factors explain why investment in higher education continues to offer the strongest economic payoff in most regions. As anticipated, within tertiary education, the chosen field of study matters a lot, with STEM, business, and health typically yielding higher economic returns than humanities, arts and social sciences. Finally, the intersection between education level and geography also matters. In regions where there is a scarcity of skills, the return to tertiary education can indeed reach very high levels (for example, Montenegro and Patrinos report a 22.2% return in Sub-Saharan Africa; a return very high in any sense).

Returns to education differ markedly across world regions, reflecting disparities in economic structure, skill supply, and labour-market dynamics. According to Montenegro and Patrinos the highest average private returns are observed in Sub-Saharan Africa and Latin America and the Caribbean. The most plausible explanation is skills scarcity. South Asia and East Asia and the Pacific also record above-average returns, consistent with rapid industrialisation and rising demand for educated workers. By contrast, OECD and European countries display comparatively lower returns (about 8–9%), largely due to the widespread attainment of secondary and tertiary education, which compresses wage premia. Among other things, these regional patterns illustrate the scarcity value of education: where educated workers are few, each additional year of schooling yields a higher productivity premium; where education is universal, returns are more moderate.

As regards Greece, several studies have shown that private returns to education in Greece have generally been moderate in size, typically on the order of 5%–8% higher wages per additional year of schooling in recent decades (Chletsos and Roupakias, 2020; Cholezas and Kanellopoulos, 2024; Patrinos, 2025). This is slightly below the global average (about 9%) as reported by Montenegro and Patrinos (2021). The somewhat lower returns in Greece compared to other developed countries may be explained by structural features of the Greek labor market, such as the large public sector, the relatively low wage flexibility and mismatches between educational supply and labor market demand. The unprecedented 2009–2015 economic crisis dampened wage premiums for education (lowering returns in the short run), but highly-educated workers still maintained an advantage (Cholezas and Kanellopoulos, 2024). Education also acted as a shield against unemployment (Cholezas et al., 2013). Finally, returns can differ by sector: private-sector jobs reward education more than public-sector jobs in Greece, reflecting different pay structures and by gender: with women's return being higher than men's (Magoula, 2023).

Another important empirical insight emerging from the comprehensive Montenegro and Patrinos (2021) is that, despite the steady global rise in educational attainment over recent decades, the returns to education have not declined substantially (as one could have anticipated thinking in terms or reduced scarcity). This pattern holds even for tertiary education, where one might have expected substantial declines due to the massification of higher education in both developed and developing countries. The persistence of high returns is interesting and should be explained in terms of the dynamic interaction between technological change and human capital accumulation. This relationship is explained by Goldin and Katz (2009) in their influential "race between education and technology" paper. According to Goldin and Katz, technological progress continually raises the demand for skilled labour, while education expands the supply of such labour. When technological innovation advances faster than the educational system's capacity to produce skilled workers, the relative scarcity of high-skill labour drives up the wage premium for educated individuals. Conversely, if educational expansion outpaces technological change, the wage premium narrows.

From this perspective, the findings of Montenegro and Patrinos (2021, i.e. that global returns to schooling have remained high and remarkably stable, leads to conclude that the pace of

technological advancement at least keeps pace with the growth in educational supply. In other words, the demand for cognitive, analytical, and digital skills has continued to rise as economies become more knowledge and technology intensive. The enduring wage premium attached to schooling thus reflects not only the private value of education but also the structural transformation of economies, in which technological progress persistently validates the need for more and better educated workers. The next big question in this empirical literature would regard the impact of artificial intelligence (AI) on the return to education. For, the rapid diffusion of this disruptive technology is likely to reshape the returns to education by altering both the demand for skills and the structure of labour markets. AI and automation tend to substitute routine cognitive and manual tasks while complementing analytical, creative, and interpersonal abilities, skills typically strengthened through higher education. As a result, the returns to tertiary education and to specific competencies such as digital literacy, problem-solving, and adaptability may rise further, while the payoff to middle-skill or routine-intensive jobs could decline. However, these are just conjectures. New evidence is needed to empirically assess how AI adoption affects wage structures and the skill premia across sectors and countries. More detailed evidence is needed to determine whether AI complements or substitutes educated labour, and whether its diffusion ultimately will amplify or narrow the returns to education in the coming decade.

2.4 Perceived economic returns to education: what students think that they can get from the labour market?

As it was examined in the previous the empirical human capital literature focuses on the measurement of actual or objective returns to education. These returns are ex post measured through actual earnings data. Yet, this creates a discrepancy between theory and praxis since individuals make their educational decisions based on perceived returns, that is, their subjective expectations about how education will affect their position in the labour market in the future. The latter includes not only expectations about wages but also contemplating future employability and forming aspirations about life opportunities. The standard human capital theory implicitly assumes that actual and perceived economic returns to education coincide, a direct consequence of the complete information assumption underlying the model. It is also

assumed that educational choices are made through an objective cost–benefit calculation, free from uncertainty, biases, or social influences, that is, they are rational choices. Although the abstractions of human capital theory have been invaluable in advancing both empirical and theoretical research, the next is the enrichment of the framework with more realistic depictions of human behavior, information constraints, and social influences aiming at a deeper understanding of how educational decisions are actually made (Manski, 1993).

In contrast with the voluminous empirical literature on the actual returns to education the literature on perception about the benefits of education is more limited. Menon (2014) in her comprehensive literature review reports two main reasons for this bibliographic gap. The first is methodological: collecting data on perceived returns is inherently difficult, particularly when aiming for large, representative samples. Measuring beliefs about future earnings requires carefully designed (valid) survey instruments capable of capturing subjective probabilities or expectations.

Unlike objective data such as wages, educational attainment, or employment status, which are readily available through administrative or household surveys (such as the Labour Force Survey or the Household Budget Survey) perceptions and expectations are subjective, forward-looking, and difficult to observe. Capturing them requires asking individuals to self-report their beliefs about uncertain future outcomes, such as their expected income conditional on completing different levels of education. Designing such survey instruments needs caution: respondents may struggle to express beliefs numerically or interpret questions differently depending on their background and experience. Moreover, ensuring representativeness and reliability compounds the difficulty. Large-scale national surveys (such as the Greek Household Budget Survey or the European Labour Force Survey) prioritize factual questions, while eliciting subjective expectations demands more time-intensive interviews and careful framing to avoid various forms of biases (e.g. reference biases). Even when such data are collected, responses can be noisy or inconsistent, requiring advanced econometric techniques to correct for measurement error and rational inattention. As a result, studies of perceived returns tend to rely on smaller, experimental, or student-based samples which are more useful for gaining insight and less useful for population inference.

Menon (2014) also reports a disciplinary reason. Economists have traditionally placed greater trust in objective, market-based data (such as observed wages) and have often regarded subjective expectations as unreliable, contaminated with biases or inherently unobservable. This tendency may echo the influence of deep-rooted neoclassical theorization such as the famous revealed preference theorem (Samuelson, 1938) that guided generations of economists in their thinking. According to the revealed preference framework individuals' preferences and expectations can be inferred from their observable choices and market behaviour, without the need to rely on what they say they believe or intend. Samuelson's idea was to help economists create models of consumer preferences and derive demand curves without needing to measure utility directly (see for example Andreou et al, 2014 for a recent empirical demonstration of this idea). Yet, this longstanding preference for observable choices began to soften with the emergence of behavioural economics, which showed that considering real-world decision-making practices such as biases, heuristics, framing effects, and social influences can enrich our understanding of social phenomena (Kahneman & Tversky, 1979; Kahneman, 2011).

As a result, today, an increasing number of economists measures and analyzes individuals' beliefs, expectations, perceptions and aspirations in many areas of applied economics. In the field of economics of education, the first to measure students' expectations on future earnings was Freeman (1971). Freeman's attempt was pioneer and at the same time premature. Nevertheless, more systematic approaches followed the next decade (Ferber and McMahon, 1979; Williams and Gordon, 1981; Psacharopoulos and Sanyal, 1981, 1982).

Psacharopoulos and Sanyal (1981, 1982) measured perceived rates of return using Mincerian functions in Philippines and Egypt respectively. Both studies were based on large samples of undergraduates and graduates and concluded that the perceived rates did not differ substantially than the actual. Indeed, one major preoccupation of the early lines of the literature was to check the validity of the main tenet of human capital theory, namely that prospective students are rational decision makers weighing current costs and future benefits. As a matter of fact, several studies do find that the perceived rates correspond relatively closely to the actual rates observed in the market (Williams and Gordon, 1981; Psacharopoulos and Sanyal, 1981, 1982; Wolter 2000, Webbing and Hartog, 2004). The overarching conclusion of this literature is that students, in most

cases, can respond meaningfully to probabilistic questions such as predicting their future earnings under different hypothetical scenarios, that is, on average they are choosing educational paths in a rational manner as hypothesized by human capital theory.

However, these studies also find significant heterogeneity in perceptions across individuals. It seems that there is coexistence of aggregate realism and individual heterogeneity. Not all students are well informed and systematically rational; often, operating in a context of bounded rationality, where expectations are shaped by both objective signals and subjective interpretations. To the extent that these elements of bounded rationality are not randomly distributed across students, but rather are correlated with certain demographic and socioeconomic characteristics, there is room for further analysis.

The work of Williams and Gordon (1981) is a good example. The authors show that by the end of their compulsory education English students are aware of the relationship between education and earnings, while the perceived rates correspond closely to the actual rates estimated by earlier studies. Nevertheless, they also provide useful evidence of differences between social classes, ability groups and gender. Girls expect to earn less than boys, students of high ability expect to earn more than those of low ability. Social background has no independent influence; yet, the intersection of social class with ability and gender matters.

Webbink and Hartog (2004) examine students' expectations about their future wages and compare these with their actual earnings several years after graduation. In addition to wage expectations, the authors collected information on students' motivation, such as weekly study hours and measures of intrinsic and extrinsic motivation. Their results reveal that female students expected to earn about 5% less than their male counterparts, a remarkably accurate prediction given that, four years later, their actual earnings were approximately 6% lower. This finding, consistent with other studies, raises two important questions: first, whether female students' expectations reflect realistic assessments of labour-market conditions or lower self-confidence, and second, whether such expectations influence academic behaviour, potentially contributing to differences in effort, persistence, or dropout risk. Webbink and Hartog further report that students from high-income families tend to anticipate higher post-graduation earnings, yet these

expectations are not supported by subsequent wage data, suggesting that socioeconomic background shapes perceived opportunities even when not reflected in objective outcomes. Again, the question arising is whether overestimation or underestimation of returns has a real impact on attitudes within the class. These research questions imply that students' expectations about their future earnings are not formed in a vacuum; they represent reflexive interpretations of the reality, filtered through personal experiences, social norms, and identity.

Jerim (2011) investigates whether UK university students can accurately predict their starting salaries after graduation. Using survey data, the author finds that full-time students overestimate their starting wage by 15% on average. Overestimation is particularly pronounced among students in the early years of study, those attending post-1992 (modern) universities, and students enrolled in disciplines such as the Arts, Humanities, and Social Sciences. In contrast, Education and STEM students predict more accurately their starting salary, while medical students underestimate their starting salary. Interestingly, part-time students form more realistic expectations. This is due to having already some experience in the labour market. Overall, it is found that students hold overly optimistic views about their early career earnings. The study does not provide a definitive explanation about the roots of optimism, but it does discuss some possible explanations (such as overconfidence or lack of information).

The analysis of Sequeira, Spinnewijn and Xu (2016) is very interesting as it is based on a quasi-experimental design aiming at finding how recognition for school achievement influences students' perceptions regarding the benefits of education. The analysis is based on data derived from two fellowship programs (i.e. programs that award financial support to high-performing secondary school students) implemented in India. The authors show that students who qualify for the fellowships develop more optimistic beliefs about the returns to higher education, both in terms of expected income and reduced income uncertainty. These students report more realistic beliefs about the labour market, suggesting that recognition may help correcting underestimation of returns; a bias often observed for low-income groups in developing countries (Attanasio and Kaufmann, 2009). Their peers do not update their beliefs about earnings, but they do become better informed about scholarship opportunities and show greater interest in applying for them. Thus, there is some informational spillover. Yet, their parents revise their expectations

upwardly. In low-socioeconomic settings, perceptions of returns to education are likely to be pessimistic, thus resulting to underinvestment in education. Correcting this bias is both feasible and desirable.

The study of Nguyen (2008) also highlights the importance of incomplete information in educational decision-making, especially in a low-income environment. Conducting a randomized field experiment in 640 primary schools in rural Madagascar, the author tested the effects of two interventions: (1) providing statistical information on average earnings by education level, and (2) presenting students and parents with local role models who shared personal stories of educational success. The study found that the provision of statistical information led to a significant increase in student effort, raising test scores by 0.2 standard deviations on average and boosting attendance by 3.5 percentage points. The effect was even stronger (0.37 SD) for students who already underestimated returns to education. Analogous to financial investments, if expected returns are underestimated, a project may be abandoned, whereas high uncertainty can make it appear too risky to pursue. Equally interesting are the results from the role model intervention. The effect of the role models was strong when they shared similar background with the students. But coming from a different background did not improve outcomes. The explanation is that students are more likely to internalize advice or mimic behaviour from someone they perceive as “like me.” This effect reconfirms other studies in similar contexts (e.g. Porter & Serra, 2020). The combination of role models with statistics weakened the effect of the statistics. A possible explanation is that role models signal that the returns to education refer to averages, while their cases are unique deviating from the average.

The paper of Jensen (2010) conducted a field experiment in the Dominican Republic estimating the perceived returns to schooling and further investigated whether improving students’ perceptions can increase their educational attainment. The sample consisted of 8th-grade boys in non-rural Dominican Republic schools. The baseline observation was that students severely underestimated the returns to secondary education. Thereafter, students were divided into the intervention group, to whom information regarding the economic returns of completing secondary school was provided (specifically that secondary graduates earn 41% more than primary graduates) and the control group to whom no information was provided. The inflow of

information caused behavioral change as the informed students completed on average 0.20–0.35 more years of schooling over the next 4 years compared to the non-informed students. The effect was stronger among the least poor students and weaker among the poorest students. The latter effect might be explained by the actual hurdles the very poor students encountered. Even if they had upwardly revised their beliefs, they still could not translate them into actual gains in attainment. Jensen's work is very important as it shows that even the provision of modest, low-cost information can shift perceptions and affect students' educational choices. Admittedly the provision of information is not panacea in a setting of severe liquidity constraints.

La Ferrara (2019) is another important paper that explores the role of aspirations in shaping economic success, arguing that individuals' hopes and ambitions can act as internal constraints, generating either virtuous or vicious cycles of behaviour

La Ferrara's analysis focuses on secondary education students' educational and occupational expectations, though the underlying mechanisms can easily be extended to university settings. The central argument is that aspirations are socially determined. In societies marked by greater educational inequality, students from disadvantaged backgrounds tend to expect less and strive less, reinforcing patterns of underachievement. The internalization of such constraints has been exemplified in the seminal theoretical work of Basil Bernstein (Bernstein, 1990; 1996) in the field of sociology of education. In the Bernstein's framework, students from disadvantaged backgrounds internalize limited horizons of possibility because codes (that is, underlying social rules that regulate communication) implicitly (but very powerfully) define what kinds of knowledge, behaviour and ambitions are legitimate. This convergence of findings across disciplines that rarely communicate with one another is indeed impressive. A direct policy implication of the above is to promote interventions such as psychological nudges, exposure to suitable role models and structural reforms aimed at reducing educational inequality.

Finally, Boneva, Golin and Rauh (2022) examine whether differences in perceived pecuniary and non-pecuniary returns to postgraduate education explain socioeconomic enrollment gaps in the UK. Using survey data from 1,002 undergraduates, the study shows that first-generation students (defined as those who are the first in their family to enter higher education) consistently expect

lower benefits from postgraduate study and these belief differences account for about 70% of the enrollment gap. Similar to La Ferrara (2019), the authors conclude that policies targeting information provision and support may help to reduce educational inequalities.

In conclusion, the study of perceived returns to education broadens our understanding of educational decision-making by acknowledging that individuals operate under imperfect information, cognitive limitations, and social influences. Evidence from both experimental and observational studies demonstrates that perceptions about the benefits of education are on average relatively accurate, vindicating the main tenet of human capital theory. Yet, they are not uniform across students, and this plays a decisive role in shaping aspirations and behaviours among certain student groups. Misperceptions, whether due to lack of information, social conditioning, or bounded rationality, can lead to underinvestment in education, particularly among disadvantaged groups. Therefore, integrating behavioural insights and sociological perspectives into the human capital framework is a useful academic refinement and a practical necessity. For, it allows the formulation of policies that go beyond financial incentives, targeting instead the informational, psychological, and social foundations of educational inequality.

That said, it would be erroneous to focus solely on expected wages. Educational choices are influenced from other broader factors such as beliefs about employability prospects, job stability, working conditions, social status, and broader life aspirations. These non-pecuniary dimensions often carry considerable weight in shaping educational decision-making. Human capital theory has been proven very influential in focusing interest to pecuniary considerations, but education is viewed as a pathway to personal fulfilment, social mobility, or identity formation. By broadening the analytical focus to include expectations about employability and life opportunities, research can better account for the multidimensional nature of educational investment decisions.

3. Methodology

Our proposed approach is to adopt a quantitative, survey-based research design aimed at measuring individuals' perceptions of the returns to education across both pecuniary and non-pecuniary dimensions. This design is particularly suitable for capturing subjective expectations—such as anticipated wages, employability prospects, and broader life aspirations. By including

information on demographic and socioeconomic variables the study allows for statistical analysis of variations in perceptions across various groups. The quantitative approach also enables the identification of relationships between perceived returns and other relevant variables, such as academic performance, academic attitudes, parental background, or field of study.

Our adopted questionnaire comprises of 75 items, grouped in four thematic groups measuring perceived returns and employability expectations, academic experience & perceptions, aspirations and motivations and demographic and background information. The next Table presents an example question for each thematic group as well as the number of items per thematic group.

Table 1: Items per thematic group and item examples

Thematic group	Number of Items	Example question
Perceived Returns & Employability Expectations	18	"Now think about the future, after your graduation. How optimistic are you that you will find a job related to your field of study?", Q64_3
Academic Experience & Perceptions	17	"Now think about the department in which you are studying. How satisfied are you with the quality of teaching provided?", Q65_1
Aspirations & Motivations	3	"How likely would it be for you to limit your professional ambitions if you faced difficulties finding a job", Q66_1
Demographic & Background Information	4	Educational level of your father and mother (please

		select the highest level attained). Q50_5
Other / Administrative (metadata, technical fields, etc.)	33	Unique identifiers and other metadata questions such as "The total time taken to complete the questionnaire".

The full questionnaire can be found here:

https://monash.az1.qualtrics.com/jfe/form/SV_cAYtqV7WzFsooaq

To enhance the validity of the questionnaire, a focus group with students was conducted prior to the main survey administration. The focus group, comprising participants from different study years and socioeconomic backgrounds, served to evaluate the clarity, interpretability, and relevance of the survey items. During the session, students were invited to complete the draft questionnaire and participate in a cognitive debriefing process, which involved think-aloud exercises, paraphrasing questions in their own words, and discussing how they interpreted key terms such as "employability" and "professional success." The discussions helped identify ambiguous concepts and potential sources of social desirability bias. Based on these revisions were made with the purpose of enhancing the understanding of each question and ensuring face and content validity. The refined instrument was again pilot tested with a small independent sample to verify that the revised items performed better in terms of clarity.

The questionnaire was initially used to draw a sample of 182 undergraduate students who completed the questionnaire in full. Participants were enrolled in various departments of higher education institutions in Greece, representing a diverse mix of fields of study. The sampling strategy followed a non-probability, convenience sampling approach, focusing on accessibility and voluntary participation while ensuring representation at least across gender and socioeconomic background. Students were recruited through university mailing lists and class announcements.

All participants were informed about the purpose of the study and assured of anonymity and confidentiality prior to participation. The mean completion time was approximately 9 minutes, indicating good engagement and reasonable cognitive load. Despite the non-random design, the sample achieved adequate heterogeneity in demographic and academic characteristics, making it suitable for exploratory analysis of how students perceive the economic and non-economic returns to education, their employability prospects, and their future aspirations.

Next Tables provide a statistical description of the sample. Initially, Table 2 shows the distribution of respondents by year of study. There is a clear concentration of first-year students, who represent nearly 69% of the total sample. Second-year students account for about 15%, while participation from upper-year students is limited, with only a small number from the third, fourth, or fifth year. Around 11% of respondents did not indicate their study year.

Table 2: Distribution of respondents by year of study

Year of Study	Frequency	Relative Frequency (%)
(1st year)	125	68.7%
(2nd year)	27	14.8%
(3rd year)	6	3.3%
(4th year)	2	1.1%
(5th year or higher)	2	1.1%
Missing responses	20	11.0%

As is shown in Table 3, the sample shows a balanced gender composition, with a slight predominance of female students (53%) which reflects very accurately the gender distribution in higher education in Greece. The representation of non-binary was negligible.

Table 3: Distribution of gender

Gender	Frequency	Relative Frequency (%)
Female	93	52.8%
Male	82	46.6%

Gender	Frequency	Relative Frequency (%)
Non-binary	1	0.6%

The distribution of family income (Table 4) reveals a clear concentration in the lower to middle income ranges, with most respondents reporting annual household earnings below €30,000. However, what stands out most in this table is the large proportion of students (38%) who selected "Don't know." This response pattern means that many undergraduates students may not have direct knowledge of their household's financial situation or may feel uncomfortable disclosing it. The high incidence of missing economic self-reports (which was also observed in the pilot trials) limits the precision of socioeconomic analyses, as it reduces the effective sample size for income-related comparisons. Nonetheless, this finding has some informational value as it suggests a reluctance to discuss family income among students, which could be linked to age, dependence on parents, or most probably sensitivity around economic status.

Table 4: Family Income

Family Income Category (EUR)	Frequency	Relative Frequency (%)
0 – 9,999	16	9.4%
10,000 – 19,999	23	13.5%
20,000 – 29,999	28	16.5%
30,000 – 39,999	8	4.7%
40,000 – 49,999	11	6.5%
50,000 – 59,999	5	2.9%
60,000 – 69,999	3	1.8%
Over 70,000	11	6.5%
Don't know	65	38.2%

To gather further information on students' socioeconomic background, open-ended responses on fathers' occupations were first reviewed and classified into five broad categories: white collar, blue collar, self-employed professional, entrepreneur, and other/unspecified. Each occupation was coded based on key terms indicating professional sector or employment type. The information derived is summarized in Table 5. The largest share of fathers falls within white-collar

occupations (36%), followed by self-employed professionals and entrepreneurs, which together make up about 15% of the sample. A smaller proportion (10%) work in blue-collar or manual jobs. The relatively high share of “Other / Unspecified” reflects diverse or difficult to unambiguously code occupations. Overall, the pattern indicates a moderately privileged socioeconomic background, dominated by white-collar and professional occupations and is in accordance with the results of Table 4 and the general socioeconomic synthesis of students in Greek higher education (Koutsampelas & Tsakloglou, 2015).

Table 5: Categorization of fathers’ occupations into broader socioeconomic groups

Occupation Group	Frequency	Relative Frequency (%)
Other / Unspecified	64	38.8%
White Collar	60	36.4%
Blue Collar	17	10.3%
Self-employed Professional	15	9.1%
Entrepreneur	9	5.5%

4. Empirical Analysis

4.1 Estimating the perceived rate of economic return to education

To derive the age - perceived income profile of students, the following methodological approach was followed. First, the questionnaire items related to expected monthly earnings (Q49_1 - Q49_4) were utilized. These items asked respondents to estimate their net income at different career stages (immediately after graduation, and several years later). The responses were then cleaned by removing inconsistencies and implausible or missing data. Next, approximate ages were assigned to each stage of the earnings timeline (e.g., 23 years for entry level, 28 for five years after graduation, 33 for ten years, and 38 for twenty years), based on typical age - study progressions. For each stage, the mean expected monthly income was calculated, producing a sequential series of expected earnings over the lifetime (Table 5).

Table 5: Age – perceived earnings profiles by gender

	All	Men	Women
Q49_1 – Immediately after graduation	925.32 (22.75)	995.70 (32.55)	844.63 (26.72)
Q49_2 – 5 years after graduation	1,397.18 (51.92)	1,529.83 (81.36)	1,245.12 (52.70)
Q49_3 – 10 years after graduation	1,904.43 (85.60)	2,090.63 (143.25)	1,690.98 (70.88)
Q49_4 – 20 years after graduation	2,733.20 (160.03)	3,022.70 (255.81)	2,401.34 (167.71)

The table shows that students expect their earnings to increase steadily with age, from about €925 at the first age point to roughly €2,730 at the last, reflecting strong confidence in upward career mobility. Men consistently report higher perceived earnings than women across all stages, with the gap widening from about €150 at the start to over €600 by the final stage. This is a typical finding in the literature (Menon, 2014). In many countries, women's perceived earnings remain around 80–85% of men's, mirroring real-world gender pay disparities. Overall, the pattern points to both optimism about lifetime income growth and an early internalization of gendered labour-market inequalities.

The next step is to estimate the perceived rate of education using the IRR approach outlined in section 2. In this study, instead of directly asking students to estimate the earnings they would receive without a university degree, the analysis adopts a model-based counterfactual approach, in which plausible non-graduate income trajectories are constructed using empirical evidence and established wage differentials from national and European sources. This choice is methodologically preferrable for several reasons. First, there is some evidence that students struggle to meaningfully estimate counterfactual scenarios that are far removed from their lived experience, particularly those who have never entered the labour market or have very limited experience (as in the case of our sample). Additionally, there is the risk of producing highly inconsistent or extreme responses due to confirmation bias (students have already chosen to study in the university). Second, constructing non-graduate earnings profiles based on realistic

figures grounds perceived returns in plausible economic parameters. Finally, this approach enables to perform several sensitivity analyses by changing the parameters of the model.

Thus, we use Greece's minimum wage as the entry wage, converted to an approximate net value of €740 per month. Thereafter we grew the non-graduate wage path by 1.5% per year to ages 28, 33, 38 under the assumption that non-graduate earnings profile is relatively flat. The following earnings structure is hypothesized.

Table 6: Counterfactual non-graduate earnings

Age	Monthly (€)	Annual (€)
23	740	8,880
28	800	9,600
33	860	10,320
38	930	11,160

To estimate the perceived rate of return we further need cost assumptions regarding the cost of studies. Table 7 provides a set of plausible estimates of cost of studies based on suggestions from students who participated in the focus group.

Table 7: Direct cost of studies

Component	Estimated Monthly Cost (€)	Duration (months)	Total (€)	Notes
Accommodation	200–400	9 months × 4 years	7,200 – 14,400	For students living away from home
Food & personal expenses	150–250	9 × 4	5,400 – 9,000	Typical student budget estimates
Books, materials, transport	40–60	9 × 4	1,400 – 2,200	Moderate academic expenses.
Subtotal (direct costs)			= €14,000 – €25,000	Mid-point: €20.000 used in model.

Students also sacrifice wages they could have earned had they entered the labour market after secondary school. Using the non-graduate earnings profile derived earlier, get the following indirect cost of studies:

Table 8: Indirect cost of studies

Year of study	Age	Estimated Foregone Annual Income (€)
1st	19	8,400
2nd	20	8,520
3rd	21	8,640
4th	22	8,760
Total opportunity cost		€34,000

Adding both components:

Total cost of studies = Direct costs + Opportunity costs = €20,000 + €34,000 = €54,000.

This figure is then used as the cost base in computing the perceived internal rate of return to university education. By plugging the data presented in Tables 6, 7 and 8, into equation (2), the following obtained IRRs are produced[2]:

- All graduates: 10% per year
- Men: 11.4% per year
- Women: 8.07% per year

The baseline results show that the perceived internal rate of return (IRR) to a university degree is highly positive, estimated at about 10% per year for the overall sample. This suggests that, based on students' expectations, the financial benefits of obtaining a degree substantially outweigh its total cost of €54,000 over the working life up to age 65. However, notable gender differences emerge men's IRR reaches 11.5%, compared to 8.1% for women, reflecting both higher initial earnings expectations and steeper perceived wage growth among male respondents. Women, by

[2] Table A1 in the Appendix contains the annual cashflows used to estimate the IRR for all, men and women, respectively.

contrast, anticipate lower lifetime earnings despite similar study costs, leading to a lower private return on investment.

The relatively high IRR values, approaching 10% overall and exceeding 11% for men, also reveal a marked optimism among first year students regarding the economic returns to higher education. Such figures are well above the average real rates of return typically found in empirical studies in Greece (Chletsos and Roupakias, 2020; Cholezas and Kanellopoulos, 2024). First year students (who form most of the sample) tend to overestimate their future earnings trajectories and possibly underestimate the risks associated with career progression. Their optimism likely reflects expectations of smooth employment paths, continuous wage growth, and limited income volatility.

The sensitivity analysis presented in Table 9 validates these findings. Even with a 20% increase in total costs, the IRR remains high; 8.9% overall, 10.2% for men, and 7.2% for women, confirming that students perceive education as a financially viable investment under a range of plausible cost scenarios. Yet, the gender gap persists and slightly widens under higher-cost conditions. Overall, the analysis highlights both the strong perceived profitability of higher education and the persistence of gendered disparities in its expected monetary payoff.

Table 9: Sensitivity analysis (different cost scenarios)

Total Cost (€)	IRR – All (%)	IRR – Men (%)	IRR – Women (%)
43,200 (−20%)	11.40	13.12	9.27
54,000 (base)	9.96	11.46	8.07
64,800 (+20%)	8.88	10.24	7.16

4.2. Moving beyond pecuniary benefits

Beyond its measurable financial returns, education generates a wide range of non-pecuniary benefits that profoundly shape individual well-being as well as labour outcomes. These benefits encompass improvements in employability, job satisfaction, health, civic engagement, and self-confidence, dimensions that, while not directly captured in income measures, significantly enhance the overall quality of life. A more focused analysis is necessary to disentangle the wider

benefits of education. Still, several interesting dimensions of non-pecuniary benefits can be derived from the sample.

For example, students' expectations of faster job acquisition can be interpreted as a form of non-pecuniary benefit of education. While the perceived pecuniary returns of education relate to higher earnings (as captured by the perceived IRR), non-pecuniary benefits encompass all non-monetary advantages associated with being more educated, such as better employment prospects and greater job security.

In that respect, Table 10 presents data regarding the expected time to find a job after graduation. The results show that most students expect to find employment relatively soon after graduation. In particular, more than half (54%) anticipate finding a job within six months, and another 19% believe it will take less than a month. Only about one in ten students foresee a longer job-search period exceeding a year. Gender differences are notable: men appear slightly more confident, with 25% expecting to find a job in under one month compared with 13% of women. Conversely, women are more concentrated in the "1–6 months" category (61% versus 47% among men), implying a more moderate yet still positive outlook. These results align with the earlier evidence of optimistic income expectations and reinforce the impression that students, while aware of some frictions in the labour market, generally hold very positive perceptions of their employability and the returns to education, with men expressing somewhat stronger confidence.

Table 10: Expected Time to Find a Job After Graduation

Expected time to find a job	Total (%)	Men (%)	Women (%)
Less than 1 month	18.7	24.7	13.4
1 to 6 months	54.2	46.6	61.0
6 to 12 months	16.8	16.4	17.1
More than 12 months	10.3	12.3	8.5

Table 11 reports students' expected type of employment at job entry. The basic finding is that students generally anticipate entering in relatively stable and secure employment after graduation, with more than half (54%) expecting their first job to be full-time. This reflects

confidence in the ability of higher education to provide access to quality employment rather than marginal or precarious work. Around one in five students foresee part-time or temporary employment, and only a small minority (about 4–6%) expect some form of underemployment, such as mini-jobs or short-term contracts. In contrast with other benefits of education, the gender differences are modest: men are slightly more likely to expect part-time work, whereas women appear marginally more optimistic about securing full-time positions. Overall, these perceptions reinforce the view that students associate higher education not only with better pay but also with qualitative advantages in employment.

Table 11: Students' expected type of employment at job entry

Expected type of employment	Total (%)	Men (%)	Women (%)
Full-time employment	54.2	53.4	54.9
Part-time employment	19.4	21.9	17.1
Temporary employment	21.9	21.9	22.0
Some form of underemployment (mini-jobs, short contracts)	4.5	2.7	6.1

Finally, the results in Table 12 reveal that students hold relatively strong expectations of working in jobs related to their field of study, which is another important non-pecuniary return to education. Over three quarters of respondents (76%) consider it very or fairly likely that their first job will be closely connected to their academic background. Again, students view higher education not only as a route to better pay but also as a pathway to professional fulfilment and identity alignment. Gender patterns show that men are somewhat more optimistic, with 82% expressing confidence in job relevance compared to 70% of women. This gap is relatively modest but, again, reflect differences in self-assessed career opportunities across fields of study.

Table 12: Expected relevance of first job to field of study

Expected relevance of first job to field of study	Total (%)	Men (%)	Women (%)
Very likely	31.6	32.9	30.5
Fairly likely	44.5	49.3	40.2
Slightly likely	21.3	15.1	26.8
Not likely at all	2.6	2.7	2.4

Overall, these findings underscore that students perceive higher education as a means of achieving professionally meaningful employment, not only as a way to increase their future income.

Conclusions

The empirical analysis confirms that students perceive higher education as both a financially and personally rewarding investment. The estimated perceived internal rate of return (IRR) of roughly 10% per year demonstrates strong optimism about the profitability of university studies, exceeding the actual returns documented in empirical labour-market research in Greece. Men report higher expected earnings than women, a gap that reflects persistent gendered expectations in the labour market. Beyond monetary considerations, students also express confidence in their employability and quality of job: most expect to find work within six months of graduation, to be employed in full-time positions, and to secure jobs related to their field of study. These results indicate that higher education is seen not only as an economic investment but also as a pathway to stability, personal purpose, and professional identity; all key non-pecuniary benefits that contribute to well-being and motivation.

The policy implications are clear. Understanding students' perceptions is crucial for designing effective career guidance and higher-education policy. The evidence of optimism and gender disparities suggests the need for better labour-market information systems, counselling services, and targeted communication strategies that help students form realistic expectations about pay, employability, and career progression. Especially, the observation of gender gaps in perceptions is a clear indication of the internalization of structural constraints by female students. Finally, recognizing the non-pecuniary motives behind educational choices also supports the development of holistic educational policies that value well-being and job satisfaction alongside earnings**.**

Future work should be based on larger and, ideally, longitudinal samples to track how expectations evolve and how they compare with actual labour-market outcomes. Experimental and cross-national studies could illuminate how cultural context, socioeconomic background, and

field of study influence perceived returns. Integrating qualitative approaches would deepen understanding of the psychological and social mechanisms shaping students' beliefs. Finally, future research should explore how perceptions of the non-pecuniary benefits of education, such as job relevance, autonomy, and social mobility, affect academic resilience and motivation. This is very important because it extends the concept of educational returns beyond purely economic measures as it is the standard human capital approach.

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Appendix

Table A1. Annual Cashflows Used in the Calculation of the Perceived IRR to Higher Education

t (years from 23)	Age	Cashflow_All	Cashflow_Men	Cashflow_Women
0	23	-54000	-54000	-54000
1	24	0	0	0
2	25	1949.091	2793.651	980.8105
3	26	2275.66	3177.426	1241.346
4	27	2619.723	3582.051	1515.596
5	28	2982.071	4008.504	1804.154
6	29	3363.535	4457.805	2107.64
7	30	3764.976	4931.018	2426.699
8	31	4187.295	5429.26	2762.001
9	32	4631.433	5953.692	3114.245
10	33	5098.368	6505.531	3484.158
11	34	5589.124	7086.047	3872.497
12	35	6104.767	7696.567	4280.047
13	36	6468.509	8115.273	4580.763
14	37	6846.329	8549.94	4893.4
15	38	7238.711	9001.118	5218.368
16	39	7646.154	9469.372	5556.091
17	40	8069.173	9955.285	5907.005
18	41	8508.301	10459.46	6271.561
19	42	8964.088	10982.52	6650.227
20	43	9437.1	11525.12	7043.483
21	44	9927.925	12087.9	7451.825
22	45	10437.17	12671.57	7875.768
23	46	11087.31	13423.16	8409.451
24	47	11765.46	14207.21	8966.061
25	48	12472.71	15025	9546.475
26	49	13210.19	15877.87	10151.6

27	50	13979.08	16767.2	10782.39
28	51	14780.6	17694.43	11439.82
29	52	15616.02	18661.05	12124.89
30	53	16486.64	19668.61	12838.67
31	54	17393.85	20718.72	13582.24
32	55	18339.04	21813.04	14356.72
33	56	19323.7	22953.33	15163.31
34	57	20349.34	24141.37	16003.19
35	58	21417.55	25379.03	16877.64
36	59	22529.96	26668.25	17787.96
37	60	23688.27	28011.05	18735.5
38	61	24894.26	29409.52	19721.66
39	62	26149.75	30865.84	20747.89
40	63	27456.65	32382.25	21815.7
41	64	28816.92	33961.09	22926.65
42	65	30232.61	35604.8	24082.36

Note: Annual cashflows reflect the difference between expected graduate and non-graduate earnings after. Positive values represent perceived income gains over the working life.