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Poor students, rich students – What actually determines the income concentration among students in Europe?

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Abstract

The framework conditions of studying such as the time available for study-related purposes depend, inter alia, on students' economic resources provided by their parents. Great financial inequality among students in this respect often causes widely differing framework conditions for studying, which may have negative effects on the duration and success of studies for parts of the student population. So, what is the actual situation regarding the financial (in)equality among students in the European Higher Education Area (EHEA)? For 28 EHEA countries, the extent of financial inequality among students was first determined with the help of the Gini coefficient. On this measure, there are relatively large differences between countries, but whose determinants are yet unknown. Several simple linear regressions seem to indicate that family-related variables – financial support from the family, students' educational background, and living in the parental home – increase income concentration among student populations significantly, while national public student support reduces it considerably. However, a multiple linear regression model shows that only national public student support has a weakly significant effect, thus superimposing the effects of social origin. This means that public student support may be even more important than previously thought, particularly with regard to achieving the objective of equity of opportunity.

Key words: study funding, income concentration, Gini coefficient, regression analyses, public student support.

1. Introduction

To successfully complete all study phases (admission, retention, and graduation), students require sufficient financial resources. Since students often cannot – or should not – finance their studies on their own, the issue of study financing is also subject of social/educational policy at European level. In the European Higher Education Area (EHEA), the ministers responsible for higher education have set objectives for (public) student funding in various declarations, which also characterise the so-called Social Dimension of the EHEA. According to the London Communiqué (2007), for instance, students should be able to complete their

studies without obstacles relating to their social or economic background. According to the Rome Communiqué (Annex II, 2020), financial support systems should aim to be universally applicable to all students. However, if this is not possible, public support systems should above all be needs-based, make higher education affordable for all students, facilitate access to higher education, and offer opportunities for success in higher education.

In a cross-country comparison, students in the EHEA differ in financial respect in several ways. This refers, on the one hand, to their income structure. Students in Georgia, for example, receive, on average, the largest part of their monthly income from their families, i.e. their parents and/or partner. Students in Malta generate most of their income through their own gainful employment alongside studies, and for students in Sweden, it is public support that provides the lion's share of their monthly income (Gwosć, 2024). On the other hand, students also differ in the magnitude of their income. For example, in summer semester 2023, students in Romania received a median income of 1,455 Purchasing Power Standard (PPS)[1] per month, whilst their fellow students in France had only 856 PPS in the same time span (Gwosć, 2024). There are also financial differences between students *within* each country, so there are comparatively 'rich' and 'poor' students. The EHEA member states also differ in how large this gap between 'rich' and 'poor' is within a country, i.e. in an international comparison, there are varying degrees of income concentration – measured by the Gini coefficient – in the student populations (Hauschildt et al., 2021). However, these differences are not only an expression of the financial heterogeneity of students but can also point to different framework conditions to which students are subject. These differences can then be reflected in students' time allocation, speed of study, grades, and the risk of dropping out of higher education (Theune, 2015; Wenz & Yu, 2010; Hovdhaugen, 2015). Against this background, our analysis examines the reasons for the different levels of income concentration among students in EHEA countries.

2. State of research and research questions

There are various empirical studies on the financial inequality of populations that also use the Gini coefficient as a measure of concentration. For example, the EU-funded project 'GINI' (Growing inequalities' impacts) analysed the characteristics and effects of inequality in income, wealth, and education for 25 EU countries as well as Australia, Canada, Japan, and the USA over time (European Commission, 2012). The causes of income concentration within the countries were identified as including long-term regional economic differences, the extent of state activities (particularly in tax and transfer policy), major growth crises, as well as changes in the employment structure and wage spread (Ballarino et al., 2012; Bjørnskov et al., 2012; Breziński et al., 2013; Ferrer-i-Carbonell et al., 2013). In a national study for Germany, the level of education and – to a lesser extent – the migration background and

[1] Purchasing Power Standard is an artificial currency that is used to simplify the comparison of amounts of money from countries with different currencies. The use of PPS as a single currency has the advantage over the use of the Euro, for example, that not only the effects of exchange rates are eliminated but also differences in the price levels of the countries.

age structure were also identified as determinants of income concentration from a socio-demographic perspective (Stockhausen, 2022). However, the above-mentioned studies refer primarily to the respective total or working populations, rather than to students, who are the population of interest here. If students are subject of concentration analysis, then they are examined, for example, with regard to the influence this group has on the income concentration in the overall population (Bjørnskov et al., 2012). As far as can be recognised, there is no study in the German- and English-language research literature that has investigated the determinants of the Gini coefficient within a student population and certainly not in an international comparison.

International comparative data on the Gini coefficient for students have been collected for several years as part of the EUROSTUDENT project (EUROSTUDENT 8, 2024; Hauschildt et al., 2021; 2018; 2015; Orr et al., 2011). In descriptive terms, the phenomenon of income concentration among students is, therefore, well documented. However, all that is known so far is that in some countries the differences in income between 'poor' and 'rich' students are relatively large, while in other countries they are comparatively small. There are no further analyses to date that satisfactorily identify the causes of the differences in the Gini coefficient. This research gap is to be closed, at least to some extent, with the present analysis.

In empirical terms, the research question to be answered is which determinants exert a significantly positive (i.e. increasing) or negative (i.e. decreasing) influence on income concentration among students in the EHEA. Possible *effects* of income concentration among students are not subject of our empirical analysis, as this would exceed the available scope. Nevertheless, section 6 discusses the theoretical and conceptual implications of a particularly high or low income concentration and whether there is an 'optimal' degree of concentration. In our opinion, addressing these issues contributes to a better understanding of the topic.

3. Theoretical framework

A theory-based explanation of income concentration among students could start with their main sources of funding and ask why these may be differently productive and thus may lead to concentration tendencies. International comparative studies have repeatedly found that the three most important sources of student financing are students' own employment, transfers from the family/partner, and public support (Hauschildt et al., 2024; 2021; 2018; 2015). A difference in the productivity of these sources is particularly evident when looking at students for whom one of these sources dominates, i.e. if one source generates more than half of total student income. Students whose income is dominated by earned income often have the highest total monthly income. Students who are mainly financed by their family/partner achieve a medium income level and their fellow students, who receive more than half of their total income from public support, often have the lowest total income (Hauschildt et al., 2021; Gwosć, 2019b). The different use of the three sources of funding by

students and the different yield of the sources could be explained by a Comparative Institutional Approach (cp. for the following Gwosć, 2019b).

Following this approach, the (labour) market, the state, and the family are regarded as institutions to which students may get access under various conditions and where they can secure their study funding.[2] Criteria for the structural analysis of institutions are a) the motive for action of the funding provider respectively the person generating the means, b) the principle of funding allocation, c) the maximum achievable level of funds, and d) the access to the institution and its provisions for students. To illustrate this with an example: When using the labour market, students generate their study funding themselves through gainful employment. Their motive for action (criterion a) may be, on the one hand, that studies provide them with a direct consumer benefit (studies as consumption good, Schultz, 1963). On the other hand, studies may increase their human capital. This may have a productivity-enhancing effect for postgraduate employment, which increases the graduates' income (studies as investment good, Becker, 1975; Schultz, 1963). Furthermore, studies may generate non-monetary effects such as personal development. The allocation of funds on the labour market (criterion b) is predominantly based on the performance principle and – at least in parts – on the social principle (e.g. in the form of a statutory minimum wage). The level of earned income (criterion c) is influenced by several factors including labour productivity and perhaps statutory minimum wage. There is no legal upper limit for employment income; an economic limit is, however, the turnover of the respective company. Students may considerably influence the level of their employment income by choosing their working hours. Students often have easy access to the labour market (criterion d). An objective market access restriction results from the national trade regulations that stipulate which commercial activities are permitted and thus which companies are in principle available to students as employers. Subjective access restrictions often only consist of a legal minimum age for employment; international students may need a work permit in addition.

If this analysis is carried out in the same way for the other two institutions, the state and the students' families, the results summarised in Table 1 are obtained.

[2] In Institutional Economics, the family is rather modelled as organisation, i.e. as a group of persons with common goals and rules; the rules, in turn, are regarded as institutions (Erlei et al., 2007). Thus, an organisation is a combination of individuals and institutions. Within the framework of the Comparative Institutional Approach, however, the family was regarded as institution for reasons of analytical simplicity and subject to the same structural analysis as the market and the state.

Table 1: Structural characteristics of institutions of study financing and actor behaviour at a glance

Characteristics	Institutions		
	(Labour)Market	State	Family
Type of financing	self-financing	external financing	external financing
Motive of the funding provider/financier	- maximising current consumer utility - maximising monetary and non-monetary returns on investment	- remedy of allocative market failures - equalising social disparities - increasing economic growth	- compliance with maintenance law - maximising utility/income - altruism - maintaining social status in the family succession of generations
Allocation principle	performance principle	- welfare principle - supply principle - performance principle	- mainly welfare principle - in addition, performance principle
Determinants of level of means	- labour productivity - possibly legal minimum wage	minimum requirement, which is based on the subsistence level	Minimum requirement, above the subsistence level if possible
Upper limit of funds	- no legal upper limit - economic upper limit: amount of company revenues	legal upper limit	- maintenance obligation: legal upper limit (which need not be exceeded) - voluntary support: no legal upper limit
Students' possibility to influence level of funds	exists, e.g. by choosing working hours	does not exist	Exists partially by desired social behaviour
Access to institution and its provisions	institution and provisions: easy access	institution and provisions: a) supply principle: relatively easy access, b) welfare principle and performance principle: very restricted access	- institution: automatic access via family membership - provisions: a) maintenance obligation: usually easy access, b) voluntary support: rather easy access (depending on family income/wealth)

Source: Based on Gwosć (2019b).

In addition to the direct influence that the three sources of funding mentioned above may have on the concentration of income among students, there may also be indirect influences, the origins of which are still unknown. To be open to the discovery of such latent variables, an explorative approach is chosen for the following empirical analysis.

4. Data, operationalisation, and methods

4.1. Dataset

The data source is provided by the EUROSTUDENT project. The project investigates the economic and social conditions of students in the EHEA through student surveys. It collects data on socio-demographics, access to HEIs, transition within the higher education system, forms of study, students' time allocation, employment and internships, resources and

expenses, students' housing situation, and their international mobility (Hauschildt et al., 2024). EUROSTUDENT is also the only international project that includes the necessary measuring instruments for a country-comparative analysis of the income concentration among student populations. Countries from all regions of the EHEA take part in the project, with 25 countries participating in the eighth round. Due to the limited number of participant countries, the analysis cannot cover the entire EHEA, but a considerable part of it. A pooled aggregate data set with information from the sixth, seventh, and eighth project rounds is used for analysis (2016 to 2018, 2018 to 2021, and 2021 to 2024). Thus, data from 28 EHEA countries are included, which participated in at least one survey from EUROSTUDENT VI, VII, or 8 and that have valid data on all required variables (65 observations in total). This determines the selection of the countries analysed.

4.2. Dependent variable

The starting point for further analyses is the distribution of student income in EHEA countries. To determine the income distribution within student populations, the average total income of students per month was referred to. This includes *cash money and bank transfers*, which students receive from their parents, other relatives, and their partner. In addition, *transfers in kind* are considered, which students receive from these groups (e.g. free meals or clothes from their parents). Furthermore, students' *income from current or previous employment* (savings) is recorded.[3] *Public support* to students is included consisting of grants, scholarships, and loans that students receive from various levels of government due to their status as educational participants. Finally, the category *other income* covers any means from private and public sources that are not included in the other categories (e.g. loans from private companies, state child benefit, or scholarships from the EU). Based on the total income, the Gini coefficient is calculated for the student population of each country.

The Gini coefficient is one of several measures available to quantify income concentration within a group of income receivers (Hartung et al., 2011; Feld et al., 2020). It is a relative concentration measure that may take on values between zero and one. A value of zero would result, if all individuals of a group received the same amount of income (perfectly equal distribution). If, by contrast, only one person received all income, while all others had no income, the coefficient would be equal to one (perfectly unequal distribution). The more unequal the income distribution within a group, the higher is the value of the Gini coefficient.

4.3. Independent variables

As there are no in-depth analyses – especially no international comparative analyses – on the income concentration of student populations, we utilise an explorative approach for identifying determinants for the Gini coefficient, considering many possible influencing factors. Various indicators from the areas finances, sociodemographics, mode of study, and

[3] Only those amounts that students use on average per month to cover their living and study costs are taken into account for savings.

lifestyle of students are used, which are included as independent variables in the regression models. For the *finance-related variables*, the three most important income sources, i.e. family support, students' employment income, and public support are considered. For each source of income, the share of recipients and the average share of the source in students' total income are taken into account for every country. Furthermore, we included the share of recipients of foreign public support and the proportion of other income in students' total income. There are several *socio-demographic variables* that may affect students' income concentration. This includes students' parents' education (as an auxiliary variable for the distribution of students' social origin in the countries), students' parenthood, disability, sex, and average age. The share of part-time students is used as variable related to the *mode of study*. Finally, a basic housing form of students (the share of students living with parents) is considered as *lifestyle-related variable*.

4.4. Methods

Firstly, we provide a descriptive overview of the dependent variable, the Gini coefficient, in a cross-country comparison (5.1.). Subsequently, the relation between the independent variables and the Gini coefficient is investigated by means of simple linear regressions (5.2.). To improve the approximation to a normal distribution, the Gini coefficients were log-transformed. Since many countries took part in more than one of the surveys, i.e. EUROSTUDENT VI, VII, and 8, we applied cluster-robust standard errors at country level (Huber, 1967; White, 1982). This accounts for potential correlations of observations *within* countries, while assuming independence across countries. The reported coefficients are exponentiated (base e) to facilitate interpretation as percentage changes relative to the independent variables.

To examine the joint influence of the explanatory variables on income inequality, we next estimated a multiple linear regression model (5.3.). This step allows us to account for potential confounding and overlapping effects among the predictors, thereby providing a more comprehensive picture of the factors associated with the Gini coefficient.

To address the relatively small number of observations in relation to the number of potential explanatory variables, we employed the Least Absolute Shrinkage and Selection Operator (LASSO) with cross-validation as a data-driven variable selection procedure (Tibshirani, 1996). LASSO reduces overfitting by shrinking less informative coefficients towards zero and thereby identifies a parsimonious subset of predictors. However, as countries differ substantially with respect to structural features of student income, we additionally assessed the robustness of the LASSO selection by repeating the procedure while iteratively excluding one country from the dataset. These leave-one-country-out analyses revealed that, while some predictors appeared repeatedly across model specifications (such as public student support, parental education, or housing with parents), the exact set of selected variables was sensitive to the composition of the sample. This indicates that LASSO in this context should not be interpreted as yielding a definitive set of 'true' predictors, but rather as providing a regularised and comparatively stable basis for subsequent multivariate modelling under conditions of limited statistical power. Accordingly, we relied on the

variables most frequently selected across these specifications for the multiple linear regression presented in section 5.3.

5. Results of concentration measurement and regression analyses

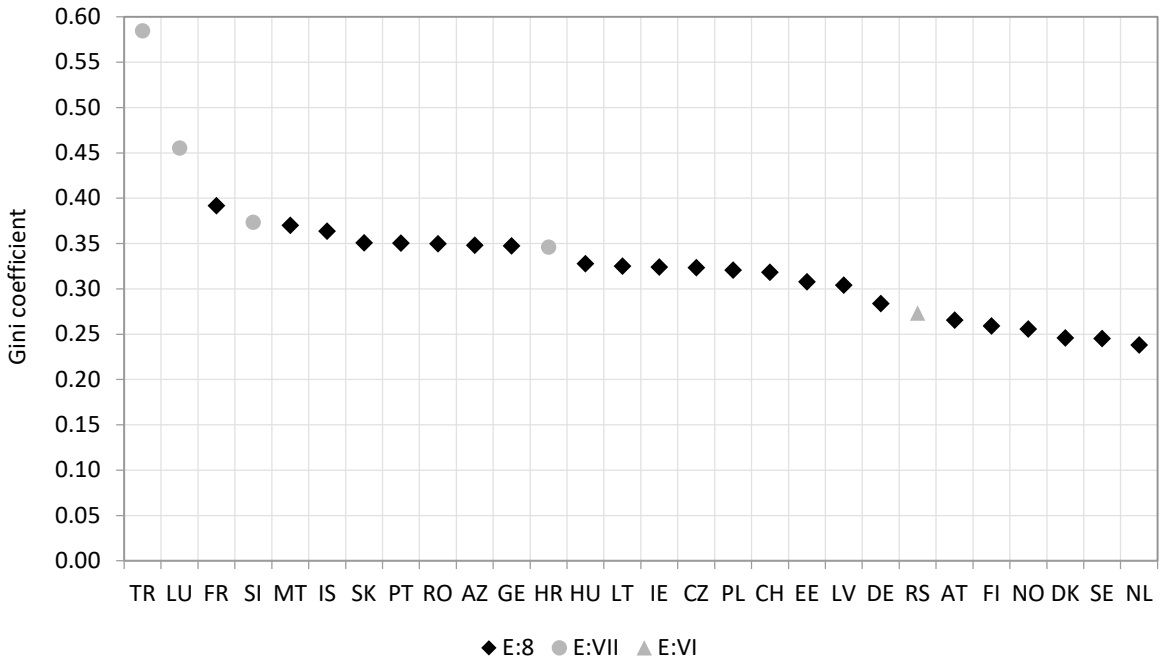
5.1. Values and interpretation of the Gini coefficient

Figure 1 displays the values of the Gini coefficient for those EHEA countries that provided data on this indicator. A relatively high level of income concentration can be found in Turkey and Luxembourg, with values above 0.40.[4] In the group of countries ranging from France to Latvia, the values are between 0.39 and 0.30. This level of income concentration can be regarded as moderate. A comparatively low degree of financial inequality among students becomes apparent in the country group with Germany, Serbia, Austria, Finland, Norway, Denmark, Sweden, and the Netherlands. There, the value of the Gini coefficient is 0.28 at most.[5]

[4] When interpreting the Turkish data, it should be noted that their data collection for E:VII took place during the COVID-19 pandemic. The pandemic may have had a concentration-enhancing effect on income distribution.

[5] In literature, there does not seem to be a standardised classification of Gini coefficient values into high, medium, and low or any other multi-level scheme. In the area of development policy, Todaro & Smith (2015) and Willis (2011) consider values from 0.5 to 0.7 as highly unequal income distribution and those from 0.2 to 0.35 as relatively equal distribution, whereby their analyses refer to income distributions of total populations. As the adequacy of such classifications is context-bound, we follow a different categorization (relatively high concentration: ≥ 0.40; moderate: 0.39-0.30; relatively low: ≤ 0.29).

Figure 1: Gini coefficient for the average monthly income of students 2016-2024[6, 7]



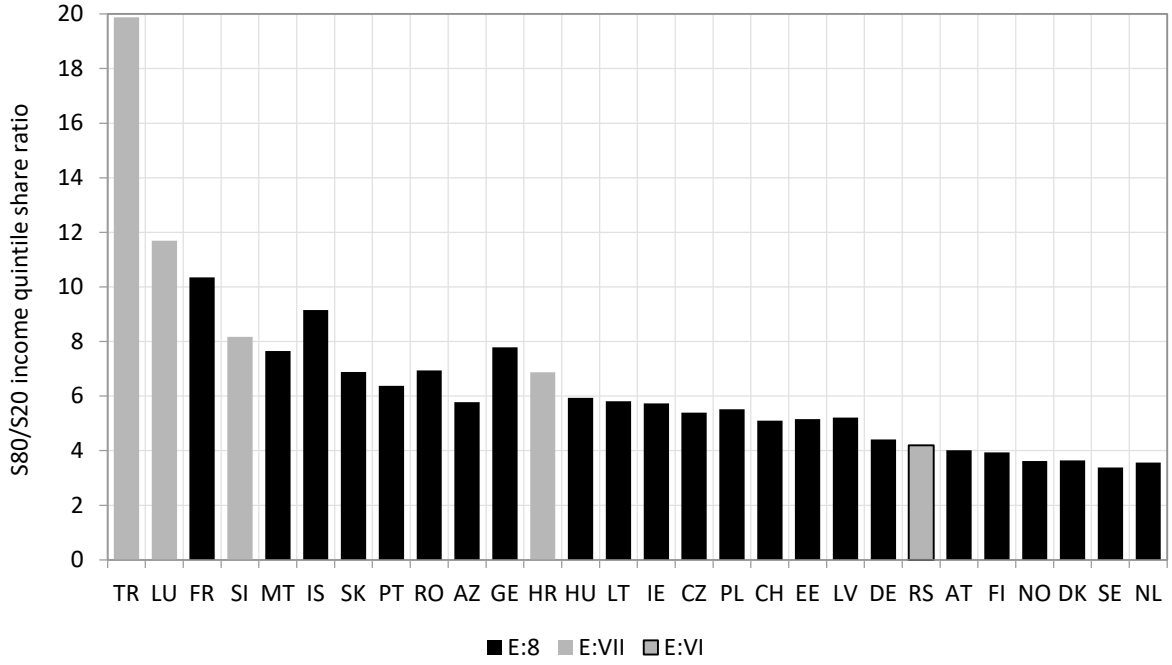
Source: EUROSTUDENT VI, subtopic G.10; EUROSTUDENT VII, subtopic G.130; & EUROSTUDENT 8, subtopic G.108.

But what does it mean, if the Gini coefficient for Turkey is 0.58, while for the Netherlands it is just 0.24? The Gini coefficient is a dimensionless measurement, which – in the present case – reduces the description of the income distribution of a whole student population to a single value. Thus, it condenses information to a very high degree. The meaning of income concentration becomes clearer when further aspects of the income distribution are considered. For this purpose, the Gini coefficient is complemented by considering the S80/S20 income quintile share ratio. This is an indicator which sets the average monthly income of the 20 % of students with the highest income (top quintile of the income distribution) in relation to the income of the 20 % of students with the lowest income (bottom quintile). The indicator thus shows how many times the average monthly income of the 'richest' fifth of students exceeds that of the 'poorest' fifth. The results are displayed in Figure 2.

[6] Country abbreviations: AT: Austria, AZ: Azerbaijan, CH: Switzerland, CZ: Czech Republic, DE: Germany, DK: Denmark, EE: Estonia, FI: Finland, FR: France, GE: Georgia, HR: Croatia, HU: Hungary, IE: Ireland, IS: Iceland, LT: Lithuania, LU: Luxembourg, LV: Latvia, MT: Malta, NL: Netherlands, NO: Norway, PL: Poland, PT: Portugal, RO: Romania, RS: Serbia, SE: Sweden, SI: Slovenia, SK: Slovakia, TR: Turkey.

[7] Since not all countries analysed could provide a value for the Gini coefficient for the eighth survey round, for some countries the corresponding value from the previous seventh or sixth round was used.

Figure 2: S80/S20 income quintile share ratio for the average monthly income of students 2016-2024



Source: EUROSTUDENT VI, subtopic G.10; EUROSTUDENT VII, subtopic G.130; & EUROSTUDENT 8, subtopic G.108.

Compared with the values of the Gini coefficient, the values for the S80/S20 income quintile share ratio do not show a monotonically decreasing trend from left to right across countries,[8] however, a decreasing trend is clearly visible. In Turkey, the country with the highest value of the Gini coefficient, the S80/S20 income quintile share ratio has a value of almost 20. This means that the top fifth of the students in Turkey receive an average monthly income which is almost 20 times as high as that of the bottom fifth of students. Or to put it in another way, the bottom fifth of students need almost 20 months to generate the same average income as the top fifth of students within one month. By contrast, in the Netherlands, the country with the lowest value of the Gini coefficient, the value of the S80/S20 indicator is 3.6. Accordingly, the 'richest' 20 % of students in the Netherlands have 'only' about three and a half times the income of the 'poorest' 20 %. This comparison emphasizes that the financial heterogeneity within a student population across countries is quite considerable.

5.2. Determinants of the income concentration as a result of simple linear regressions

What is the reason for the large differences in financial heterogeneity across countries? The following table contains the results of simple linear regressions that provide information on this (Table 2). The log-transformed Gini coefficient for the various countries is the dependent

[8] This is because the S80/S20 income quintile share ratio includes only the two ends of the income distribution in the analysis, thus ignoring a considerable part of the distribution. Nevertheless, the indicator is revealing and a good addition to the Gini coefficient.

variable, which is related to independent variables from the areas finances, socio-demographics, mode of study, and lifestyle of students.

Both indicators of family support point to a potential effect on income concentration. The share of students receiving family support is close to conventional significance levels ($p = 0.063$), while the share of family support in students' total income is statistically significant ($p = 0.029$). These findings suggest that family resources may indeed contribute to the concentration of student income. Students from families providing more substantial support appear to be better positioned within the income hierarchy, which may reinforce inequalities between those with and without access to family-based financial means.

In contrast, income from gainful employment shows no statistically significant effects. Neither the share of employed students ($p = 0.623$) nor the share of self-earned income in students' total income ($p = 0.844$) are associated with income concentration. This supports the interpretation that student employment primarily serves as a financial buffer to meet essential needs, rather than as a channel through which a minority of students generates particularly high income levels.

Regarding national public student support, the results are more differentiated. The share of students receiving such support is not significantly related to income concentration ($p = 0.088$). However, the relative weight of national public student support in students' total income is negatively and strongly associated with inequality ($p = 0.000$). In other words, financial disparities among students are lower in contexts where public support plays a more prominent role compared to family transfers or earnings from employment. This is not a matter of course, as state support for students is not only used with the objective of social equalisation (social principle), but often also with the objective of promoting performance (performance principle) (Gwosć, 2019b). High performance in the form of particularly good school and study grades, however, which are then used as criteria for awarding state support, is particularly common among students with a high educational background, i.e. those who come from more affluent homes (Schneider et al., 2017; Lörz et al., 2012; Maaz et al., 2011). Thus, this type of public support would have an amplifying effect on income inequality; yet this expected effect is obviously overcompensated by state support in accordance with the social principle. Further income components, such as foreign public support ($p = 0.217$) or other income, which includes e.g. loans from private companies or state child benefit ($p = 0.725$), show no significant relationship.

Table 2: Results of simple linear regressions with log. transformed Gini coefficient as dependent variable

	exp(β)	SE	p	exp (95 % CI)		adj. R^2
Models with finance related variables						
Share of students receiving family support	1.003	.002	0.063	1.000	1.007	.092
constant	.251	.037	0.000	.185	.340	
Share of family support in students' total income per month	1.004	.002	0.029	1.000	1.007	.133
constant	.280	.022	0.000	.240	.328	
Share of students employed during the whole semester[a]	.999	.001	0.623	.996	1.002	.010
constant	.335	.022	0.000	.292	.384	
Share of self-earned income in students' total income per month	1.000	.002	0.844	.996	1.005	.014
constant	.319	.031	0.000	.261	.390	
Share of students receiving national public student support	.998	.001	0.088	.995	1.000	.086
constant	.356	.018	0.000	.321	.396	
Share of national public student support in students' total income per month	.994	.001	0.000	.991	.996	.277
constant	.353	.009	0.000	.335	.373	
Share of foreign public support in students' total income per month	.917	.063	0.217	.797	1.055	.039
constant	.335	.012	0.000	.312	.360	
Share of other income in students' total income per month	1.003	.009	0.725	.984	1.023	.010
constant	.319	.017	0.000	.285	.356	
Models with socio-demographic variables						
Share of students from non-academic backgrounds	1.005	.002	0.010	1.001	1.009	.146
constant	.261	.023	0.000	.218	.312	
Share of students with children	1.000	.004	0.943	.992	1.009	.016
constant	.323	.018	0.000	.289	.362	
Share of students with disability	.992	.004	0.077	.983	1.001	.116
constant	.374	.025	0.000	.326	.430	
Share of male students	1.004	.008	0.631	.988	1.020	.008
constant	.275	.096	0.001	.134	.562	
Students' average age	.985	.015	0.344	.954	1.017	.026
constant	.478	.189	0.072	.212	1.074	
Model with mode-of-study-related variable						
Share of part-time students	1.002	.002	0.341	.997	1.007	.009
constant	.314	.015	0.000	.284	.347	
Model with lifestyle-related variable						
Share of students living with parents	1.005	.001	0.001	1.002	1.007	.210
constant	.276	.014	0.000	.248	.306	

Source: EUROSTUDENT VI, VII, & 8, own calculation; n = 65 (clustered in 28 countries; standard error and significance cluster corrected); log. transformed dependent variable, exponentiated coefficients. [a]: Due to differing aggregation categories in EUROSTUDENT VI, VII, & 8, deviating definitions had to be used for the three project rounds (EUROSTUDENT VI: Share of students employed during the lecture period and lecture-free period (except AT and DE, there: Share of students employed during the whole lecture period), subtopic H.31; EUROSTUDENT VII: Share of students employed during the (whole) lecture period at least from time to time and employed during a lecture-free period within the last 12 months, subtopic H.3; EUROSTUDENT 8: Share of students employed during the whole lecture period and employed from time to time during the lecture period, subtopic H.1).

Among socio-demographic factors, the share of students from non-academic backgrounds is significantly related to income concentration ($p = 0.010$), suggesting a link between social origin and financial disparities within the student body. The larger the share of students from non-academic parental homes, the greater is the financial heterogeneity within a student population. With every percentage point of students whose parents do not have a university degree, financial inequality increases by 0.5 percentage points. A weaker, but noteworthy tendency emerges for students with disability, who are associated with slightly lower inequality ($p = 0.077$). With respect to the other socio-demographic variables (parenthood, $p = 0.943$, sex, $p = 0.631$, and average age, $p = 0.344$), no evident findings can be identified, in some cases surprisingly. Students with children, for instance, objectively have clearly greater financial requirements than their fellow students without children. It is, therefore, conceivable that the proportion of the first group would contribute to a larger financial heterogeneity among students; however, this is not the case.

The mode-of-study-related variable has no significant effect: the share of part-time students is unrelated to income concentration ($p = 0.341$). By contrast, the lifestyle-related factor matters: a higher proportion of students living with their parents is positively associated with income concentration ($p = 0.001$; +0.5 percentage points increase per each additional percentage point of students living with parents). This is partly because students from wealthy families live more often in the parental home compared to their fellow students from low-income families (EUROSTUDENT 8, 2024; Hauschildt et al., 2021). In the vast majority of countries, the first group also receives a higher level of benefits in kind from the family (EUROSTUDENT 8, 2024; EUROSTUDENT VII, 2021; & EUROSTUDENT VI, 2018).

To summarise, the simple regressions indicate that the share of national public student support in students' total income is the most robust factor counteracting the concentration of income. Family support shows signs of a concentration-enhancing effect as the share of family support in students' total income is positively associated with income inequality. In addition, two origin- and lifestyle-related variables – the proportion of students from non-academic backgrounds and the share of students living with parents – likewise contribute to higher levels of income concentration. These findings suggest that financial disparities among students are shaped not only by the presence or absence of public support, but also by social background and family-related resources.

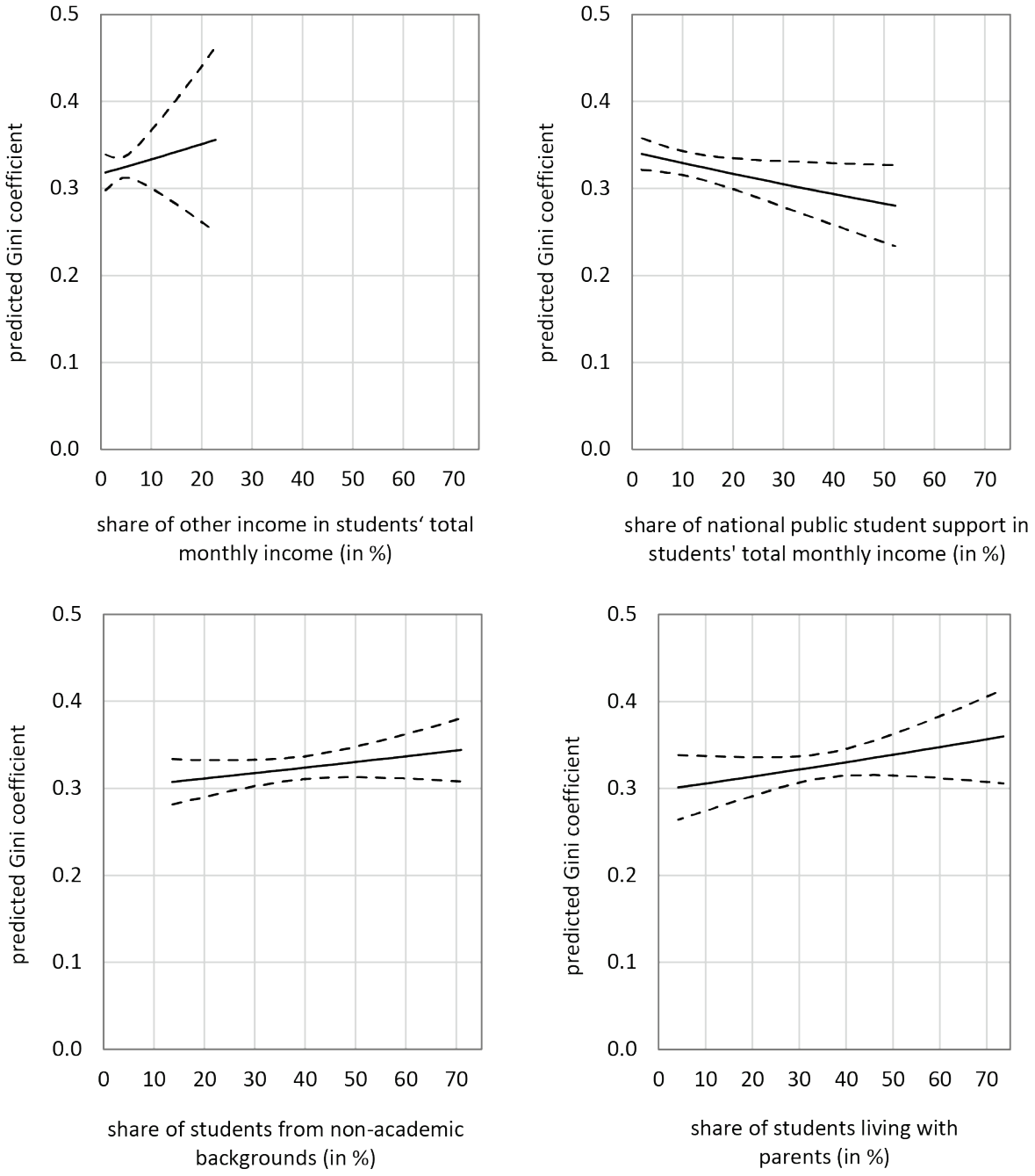
5.3. Determinants of income concentration as result of a multiple linear regression

The independent variables used may have a direct or indirect influence on the level of the Gini coefficient. A direct influence is likely to exist, e.g. for the share of a certain income source (like national public student support) in students' income, whilst the form of housing may rather have an indirect influence. To identify the most relevant predictors among the comparatively large set of potential covariates (Table 2), we applied a LASSO regression with cross-validation and cluster-robust standard errors at country level (cf. section 4.4). This procedure penalizes less informative predictors by shrinking their coefficients towards

zero and thereby selects a parsimonious model that avoids overfitting given the limited sample size. The optimal model specification includes four independent variables: 1) the share of other income sources in students' total monthly income (although this variable was clearly not significant in the simple linear regression), 2) the share of national public student support in students' total monthly income, 3) the proportion of students from non-academic backgrounds, and 4) the share of students living with their parents.

In the subsequent multiple linear regression model using these selected variables (Table A1, Figure 3), the adjusted coefficient of determination is 0.33, indicating a moderate explanatory power of the model. Among the predictors, the share of national public student support shows a negative association with income concentration, which is statistically weak but close to conventional significance levels ($p = 0.062$). The other variables do not reach statistical significance – this applies also to the share of family support in students' total monthly income, which was still significant in the simple linear regression. This result suggests that, while various finance-related and socio-demographic factors are linked to inequality in bivariate analyses, their explanatory contribution largely diminishes when controlling for the extent of national public student support. In other words, higher levels of state commitment to student financing are associated with lower income concentration, whereas the influence of other income variables, students' social origin and housing situation becomes negligible once this factor is considered.

Figure 3: Results of multiple linear regression with log. transformed Gini coefficient as dependent variable (y-axis)



Source: EUROSTUDENT VI, VII, & 8, own calculation; n = 65 (clustered in 28 countries; standard error and significance cluster corrected); log. transformed dependent variable, exponentiated coefficients; 95 % confidence intervals. Coefficient for public support weakly significant (p = 0.062), other coefficients not significant (p = 0.537, p = 0.207, resp. p = 0.190; cf. Table A1).

6. Discussion

As described above, the Gini coefficient as a measure of income concentration can take on values between zero and one. What challenges could be associated with a particularly low or high income concentration? In economics, it is assumed that a generally *high* and

persistent level of income inequality in the total population may provide wrong economic incentives, if, for example, inequality is the result of subsidies to companies and transfer payments to certain private households and not of performance-related income (Stiglitz, 2012; Gwosć, 2019a). Wrongly designed state benefits could then distort the educational and employment decisions of individuals, e.g. by restricting or even eliminating investments in education and employment due to public support. Further negative effects are feared with regard to the realisation of investments in other production factors, the development of innovations, the acceptance of entrepreneurial risk, economic growth and its sustainability, social cohesion in the population as well as trust of citizens in (state) institutions and the future (Petersen, 2019; OECD, 2015; Dabla-Norris et al., 2015; Schirmer, 2023; Gwosć, 2019a).

The same negative effects, however, could also arise if income inequality was very *low* and – in a theoretical extreme case – if there was a perfectly equal distribution (Petersen, 2019; Zimmermann, 1996). The negative effects of such a completely egalitarian distribution of income would be particularly likely if the resulting incomes were not sufficient to cover everyone's essential needs. However, the problems outlined above are generally associated with a very *strong* and lasting income inequality within the total population or at least within the working population.

Accordingly, it could be argued that a strongly unequal distribution within the student population would be rather a minor problem. Firstly, the student population is only a very small proportion of the total population (in Germany, for example, this proportion makes up less than 4 % of the total population). Secondly, an existing income inequality among students might be only a temporary problem that would only exist for the duration of their studies. However, this must be countered by the fact that great financial inequality among students is generally accompanied by very different framework conditions for studying. For instance, students who come from a wealthy family and receive extensive financial support from their parents are usually not forced to work to finance their studies and living expenses. They could then devote their time primarily to their studies. The situation is different for students who come from families with low income and assets. These students are often forced to work alongside their studies, which means they have less time to devote to study-related purposes.[9] Employment alongside studies may have detrimental effects on study success; this is often the case when employment takes up a large amount of time. Such negative effects include an extended duration of studies (Theune, 2015; Triventi, 2014; Body et al., 2014), worse grades (Wenz & Yu, 2010; Callender, 2008; Jirjahn, 2007), an interruption of studies or even complete cancellation of the study programme (Hovdhaugen, 2013; Moulin et al., 2013). These effects may then also have a negative impact on students' return on education in the form of higher study costs, reduced earnings after studies and thus also a longer amortisation period for the educational investment (Anger et al., 2010). Hence, a high degree of income concentration might not only have short- to medium-term effects on the framework conditions of studies but also a long-term effect on the return on

[9] An analysis of the time allocation of students in Germany has shown that employed students reduce their study time by an average of 32 minutes for every additional hour of employment (Apolinarski & Gwosć, 2020).

investment of the study programme. The topic of student financing, therefore, also touches on various aspects of equal opportunity.

Just as various negative economic effects for *society* are feared for extreme values of income concentration around the values of the Gini coefficient of zero and one, it is also assumed that a moderate degree of income concentration, which may result as a consequence of state redistribution policy, can certainly be compatible with other potentially conflicting objectives, such as economic growth (see Okun, 1975 and Baumol et al., 2020, for the trade-off between economic growth and state redistribution). However, it has not yet been possible to identify a specific range of values for this (Zimmermann, 1996). Similarly, it could be concluded that there may be a range of the Gini coefficient for income concentration among *students*, which reduces or ideally even avoids the feared negative consequences in the form of widely differing study framework conditions and educational returns. However, the value range of this span is also still unknown, hence, raising a follow-up question for further research.

7. Conclusion and outlook

Monthly income is unevenly distributed among students, as is the case among other population groups. The present analysis has shown that the financial heterogeneity – measured by the Gini coefficient – in the student populations across different countries of the EHEA is quite large. Income concentration among students is relatively high in Turkey and Luxembourg, with values of more than 0.40. In Germany, Serbia, Austria, Finland, Norway, Denmark, Sweden, and the Netherlands, it is comparatively low at a maximum of 0.28. Various simple linear regressions suggested that the share of family support in students' total income, the share of students from non-academic backgrounds, and the proportion of students living with parents increase income concentration significantly, whereby the form of accommodation indicates that students receive economic support from their parents in the form of transfers in kind. By contrast, the share of national public student support in students' total income had a significantly income-levelling effect. However, the multiple linear regression model showed that family-related variables lost their explanatory power and only national state support had a weakly significant effect. The initial question of what determines the gap between 'poor' and 'rich' students in international comparison can, therefore, currently only be explained with some degree of statistical certainty by the extent of national public student support in the countries.

Another question concerned the possible negative effects that can be associated with extreme levels of income concentration, whereby in reality the case of *high* inequality is likely to be of particular importance. A high concentration of income among students is associated with different framework conditions for studying. This may result, in the short term, in different time allocation for studies, employment, and other uses of time and lead to an uneven distribution of the risk of an extended study duration, poorer grades, or dropping out of university. In the long run, this may be disadvantageous for returns on

education. It is to be feared that students from low-income families in particular could suffer such cumulative disadvantages due to their strongly limited financial resources.

The Gini coefficient is a useful tool for measuring relative concentration, as it condenses the data of the entire income distribution of a population into a single measure. However, this is also a reason to be cautious in its interpretation. Especially, questions of distributive justice should generally not be answered solely based on this coefficient, as it is possibly only a snapshot and does not reflect the important distribution of lifetime income (Bundesministerium der Finanzen, 2017). Nevertheless, it is precisely this snapshot that is important here because, in the case of students, it may have implications for their lifetime income perspective.

According to the political declarations of the EHEA countries, public student funding plays a central role in shaping the Social Dimension of the EHEA. Based on our results, state funding is obviously also particularly suitable to reduce income concentration among students and diminish social disparities. The comparatively wide range of the Gini coefficient in international comparison certainly leaves room for greater government involvement in some of these countries. Given that public student support is identified as the most significant factor in reducing income concentration and superimposing the effects of social origin, countries – particularly those with high Gini coefficients – could prioritize increasing the scope, accessibility, and generosity of their national public student support schemes (grants, scholarships, loans). This is crucial not least in order to achieve greater equity of opportunity.

8. Annex

Table A1: Results of multiple linear regression with log. transformed Gini coefficient as dependent variable

Independent variables	exp(β)	SE	p	exp (95 % CI)	
Share of other income in students' total income per month	1.005	.008	0.537	.988	1.022
Share of national public student support in students' total income per month	.996	.002	0.062	.992	1.000
Share of students from non-academic backgrounds	1.002	.002	0.207	.999	1.005
Share of students living with parents	1.003	.002	0.190	.999	1.006
constant	.280	.027	0.000	.229	.342
R^2			0.372		
adjusted R^2			0.330		
n observations			65		
n cluster (countries)			28		

Source: EUROSTUDENT VI, VII, & 8, own calculation; n = 65 (clustered in 28 countries; standard error and significance cluster corrected); log. transformed dependent variable, exponentiated coefficients; 95 % confidence intervals.

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