Influence of various factors on academic performance

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1. Abstract

This study delves into the determinants of academic success among students at Kyiv School of Economics, exploring the influence of various factors on their academic performance. Drawing upon a sample of 72 participants, encompassing both bachelor's and master's students, this research investigates the impact of participation, attendance, confidence levels, social media usage, and the relevance of work spheres on students' Grade Point Average (GPA). Employing multivariate linear regression analysis, the study uncovers various insights, revealing that active class engagement, high attendance rates, strong self-belief, limited social media use, and relevance of work to studies significantly correlate with higher GPA scores. Notably, factors like active participation and confidence in academic capabilities emerge as more consistent and robust predictors of academic success than others, echoing the nuanced interplay between various determinants and GPA outcomes. These findings offer valuable implications for educational strategies, suggesting avenues for fostering a conducive academic environment, particularly at KSE while advocating for further exploration into the multifaceted nature of academic success in diverse educational settings.

Keywords: Academic performance, GPA, Multivariate linear regression, Determinants of academic success

Contents

2. Introduction

Academic performance is the predominant longitude assessment of a young person's abilities. Studying routine evolves into rooted habits that influence such detrimental life aspects as subjective well-being, health state, and career prospects. Expanding scientific material on academic success determinants provides the opportunity to enhance not only learning efficiency but also to initiate new research regarding various cross-sectional spheres of human activities.

The study's experimental site and target audience are the Kyiv School of Economics. The institution is the modern hub for supplying qualified specialists to the labour market and is the centre of our research for several reasons. Firstly, KSE's unique methodology distinguishes it from similar governmental organisations and requires individual investigation. Secondly, since the majority of the university's operations can be considered relatively new in the Ukrainian educational field, the system is far from stabilised. Nevertheless, the sample size of students accumulated by the school so far is sufficient to conduct the first global analysis of academic results based on certain individual daily behaviours.

Innovation certainly secures competitiveness in the market, but without a comprehensive examination of the outcomes achieved, there is a potential risk of losing progress. Evaluating the personal tendencies of students allows us to identify the path to restructuring study programmes into a more effective model. Thus, the examination aims to diagnose the state of the newly formed education system and identify its strengths and weaknesses through a student-oriented approach.

Therefore, the study contributes both globally and domestically. Undoubtedly, the results obtained are of utmost importance to the knowledge pool on education due to the identification of the most influential academic success factors. Subsequently, other universities, course platforms, private experts, and any organisations involved in teaching can take the developments into account. Notwithstanding, primarily, the findings are aimed at advancing the local community by contributing to determining the most favourable strategy for the growth and development of the Kyiv School of Economics.

3. Literature review

Our study is driven by the overarching goal of investigating the critical determinants that impact the academic performance of Kyiv School of Economics (KSE) students. To build a comprehensive understanding of this issue, we have selected five research papers that examine the relationship between academic achievement and distinct factors. By drawing upon the insights derived from these studies, we aim to formulate a well-grounded model for our analysis that specifically applies to KSE students.

A large number of studies addressed the issue of academic performance from many perspectives. In this research, we focus on the main determinants of students' performance as our main criteria in overviewing the main literature on this topic. In doing so, we go beyond the conventional determinants of education performance such as social or migration origin by centring our attention on more unconventional factors (Lourêiro, 2019). As such, we choose sleep duration, social media usage, one's self-efficacy and study habits, as well as the existence of a job, as the main factors that influence a student's academic performance.

3.1.1. Sleep Quality, Duration, and Consistency

The sleep quality sub-set of papers brings forward the sleep duration as the main factor of academic performance. According to their argument sleep helps students relax their brains, leading to unlocking their potential for information processing (Okano, 2019). In line with this reasoning, studies demonstrate that there is a positive correlation between sleep duration, quality of sleep and students' performance scores. In the longitude of a week/a month, this relationship was proven to be positive. However, it is noteworthy that the study found no significant effect when assessing sleep measures on a single night before a test. By contrast, sleep inconsistency is found to negatively affect academic performance,

especially in males (Okano, 2019). This suggests that the cumulative impact of sleep habits over time plays a crucial role in academic success. The study's use of a non-probability sample of 100 students and quantitative measures obtained through wearable activity trackers lends credibility to its findings, providing valuable insights into the objective theoretical foundation for investigating sleeping habits in the context of academic performance.

3.1.2. Social Media Usage

In contrast to the previous strand, social media usage shifted its focus from the physiological determinants of academic performance to network aspects of students' functioning. Many studies argue that in today's digital age, social media and the Internet have become integral components of students' lives, significantly influencing their educational experiences (Lau, 2017). The analysis conducted based on data collected through anonymous online surveys shows that social media multitasking has adverse effects on grades while utilising social media to support learning fails to demonstrate any significant relationship with academic success. Overall, all aspects of social media usage for non-academic purposes negatively predict performance scores (Lau, 2017).

3.1.3. Self-Efficacy and Stress

Academic self-efficacy pertains to students' confidence in their abilities to effectively undertake various academic tasks, such as exam preparation and term paper writing (Zajacova, 2005). Additionally, the analysis considers stress characterized as a state of psychological arousal that occurs when external demands exceed an individual's adaptive abilities. While these two concepts are inherently interconnected, research usually uncovers that heightened stress levels among students do not correlate with any of the three academic outcomes examined in the study. In contrast, academic self-efficacy emerged as a significant and positively influential factor, particularly impacting students' credits and GPAs (Zajacova, 2005). This finding underscores the pivotal role that students' self-belief in their academic capabilities plays in shaping their academic success, highlighting the significance of nurturing academic self-efficacy to enhance academic performance.

3.1.4. Study Habits

Study habits are mainly external factors that facilitate the study process such as sound study routines that include how often a student engages in studying sessions, reviews the material, self-evaluates, rehearses explaining the material, and studying in a conducive environment (Credé, 2008). As was found high-performing students exhibited a set of consistent habits that contributed to their academic excellence. They display exemplary attendance records, seldom missed classes, arrived on time, actively engaged in note-taking during lectures, and actively participated in class discussions. Moreover, these students proactively contributed their opinions, sought clarification when needed, adhered to assignment deadlines, and actively sought feedback on their work (Cerna, 2015). While studies of this scope have investigated deeply how certain study habits affect academic performance, there were no findings on whether an individual's extracurricular interests, such as reading, fitness activities, or participation in team sports, have any bearing on their academic performance. Moreover, the outcomes of such an inquiry could potentially be utilized to enhance the overall campus experience for students.

3.1.5. Working During School

Kyiv School of Economics, like many other universities, has a work-study scholarship program for students who wish to cover the full price of education. Hence, the intricate balance between employment commitments and academic dedication during college years is crucial for policy formation and students' decisions on whether to take a job or not. Researchers concluded that for every additional hour allocated to work, students appeared to allocate one hour less to their academic studies. The cumulative effect of this trend is striking, with the median student potentially spending 25% less time on academic endeavours if engaged in an extra half-hour of work each day. Consequently, this com-

promise in study time could culminate in a substantial predicted decline in grade point averages, estimated to be approximately half a letter grade lower (Stinebrickner, 2003). However, while the findings significantly contribute to the understanding of the impact of work-study programs on academic performance, there is still a need for further exploration. Specifically, there exists a call for more in-depth investigations into additional influential factors that may interact with work commitments and their effects on students' academic journeys. By addressing these complexities, future research can build upon the valuable insights presented in this study and further enrich our comprehension of this crucial intersection between work and education.

Our study centres around the following research question: "What are the key factors that influence academic performance among KSE students?". On the one hand, we aim to shed light on the general effect pattern of certain regular practices on general success in studies. On the other hand, the intention is to establish the crucial behaviour directions that regulate academic performance in the nontraditional academic surroundings of KSE.

4. Data and Methods description

4.1. Data Sources

The primary data for this analysis was obtained from a survey administered to BA25, BA26, and MA KSE students. Investigating this particular population sample is justified by the GPA metric's availability, which enables to investigate relationship between lifestyle, study habits, and academic performance. The survey addresses the notable absence of empirical data on students' daily personal choices in the context of studying, especially within KSE and other Ukrainian universities. Hence, our research may offer a foundational platform for future research in this area.

The sampling strategy was based on voluntary participation with the opportunity for interested students to contribute. While this method captures authentic responses, it leaves a possibility for selection bias: participants might be more self-aware or academically advanced than non-participants. Nevertheless, the dataset supplies crucial insights into the interplay between determinants of academic performance within the surveyed group.

The collected data includes information on 72 participants, with 76% being bachelor's students, 24% master's students, and a gender distribution of 65% female and 35% male (see Annex 1).

4.2. Dependent Variable

The centre of our study is academic performance, measured by the yearly Grade Point Average (GPA). The parameter offers a comprehensive view of a student's academic consistency and proficiency. Due to its widespread recognition, an objective assessment of academic outcome predictors can be conducted, ensuring our findings are broadly relevant and interpretable.

4.3. Independent Variables

The research includes numerous independent variables to obtain a holistic view of students' experiences. Variables range from basic socio-demographic information to specific lifestyle behaviours. This way, both direct and indirect factors of influence are examined. The full list of independent variables:

The full list of independent variables:

- Social-Demographic variables:
  - Gender: (Male/Female/Other)
  - Study Programm: (Bachelor's degree/Master's degree)
  - Living Arrangement: (With parents/With other KSE students/ With non-KSE students/By yourself/With a partner)
- Sleep Duration:

  - Average hours of sleep per day during the last year of study: (1-2, 3-4, 5-6, 7-8, 9-10, 11-12)
- Social Media Usage:
  - The average number of hours spent on social media per day during the last year of study (Instagram, Telegram, YouTube, TikTok, X (Twitter), etc.): (less than 1, 1-2, 3-5, 5-6, more than 6)
- Study Habits:
  - Participation in class discussion (Yes/No)
  - The average number of hours spent on studying during the day (not including the time spent on attending lectures/seminars): (Less than 1 hour/1-2 Hours/3-4 Hours/5-6 Hours/More than 6 hours)
  - Approximated weekly class attendance: (per cent, factor)
- Working During School:
  - Nature of job (Full-time/Part-time/no)
  - Does your job relate to your study program? (Yes/No)
- Hobbies: Variety of activities that can be set on campus for students (Gym, Team sports, Learning a foreign language, Reading)
- Self-efficacy level

To obtain more accurate results, given the relatively small sample size, in the data preparation part we reordered the levels inside some of the independent variables. Sleep duration became “According to the norm” or “Not according to the norm,” reflecting the ideal 7 to 10 hours of adult sleep. Study hours were refined to “Less than 1 hour” and “1 to more than 6 hours” for better differentiation. Confidence levels were simplified to “Very confident” and “Not confident” by grouping similar categories, aiming to clarify distinctions. In the Attendance variable, “ 50%” and “ 75%” became “Low,” and “80 - 89%,” “90 - 99%,” and “100%” became “High” for clearer representation. For Social Media Usage, “3 - 5 hours” and “5 - 6 hours” merged into “3 - 6 hours,” while “Less than 1 hour” and “1 - 2 hours” combined as “Up to 2 hours,” with “More than 6” introduced for high usage. These adjustments were undertaken to ensure that our data analysis would yield more meaningful and interpretable results, given the unique characteristics of our dataset and research objectives.

4.4. Prior expectations

Before diving into analysis, it is crucial to set the initial hypotheses rooted in prior research and foundational theory. These expectations act as benchmarks, setting the stage for empirical testing and potential validation or challenge.

- H1: Higher sleep duration is expected to have a positive effect on one’s academic performance.
- H2: Increases in hours of social media usage are expected to have a negative effect on academic performance.
- H3: Active participation in discussions during the class is expected to have a positive effect on academic performance.
- H4: High class attendance is expected to have a positive effect on academic performance.
- H5: An increase in time spent studying during the day is expected to have a positive effect on academic performance.
- H6: The absence of a job is expected to have a positive effect on academic performance, and a full-time job is expected to have a more significant negative effect on academic performance in comparison to a part-time job.
- H7: A job related to one’s sphere of study is expected to have a positive effect on academic performance.
- H8: One’s higher evaluation of self-efficacy is expected to have a positive effect on academic performance.

4.5. The model

Given these variables, our model is represented as:

$$\text{GPA} = f(\text{Social-Demographic variables}, \text{Sleep Duration}, \text{Social Media Usage}, \text{Study Habits}, \text{Working During School})$$

This model matches perfectly with the research objectives. By assessing socio-demographic details, we can understand foundational attributes of general academic success and extend the knowledge body on education. Additionally, variables like Sleep Duration and Social Media Usage offer insights into the cognitive function operations pattern of KSE students specifically. Our comprehensive model aims to unveil the intricate links between personal choices and academic success.

The selected analytical method is multivariate linear regression, as it aligns the most with the study's objectives to determine relationships between multiple categorical predictors and continuous dependent variable (GPA). The approach allows to assess the effect of multiple independent variables jointly while controlling for one another. This way, complex interactions between various factors can be found as well as their cumulative impact on academic performance.

5. Empirical Analysis

Empirical regression analysis evaluates the importance of the selected predictors in shaping the level of academic performance through the method of backward section applied to the full model with all independent variables in order to reveal factors of significant influence (see Annex 2, col. 1).

The final reduced model is as follows (see Figure 1):

```
  Call:
lm(formula = GPA ~ Participation + Attendance + Confidence +
    Social.media + Work.sphere, data = responses)

Residuals:
     Min       1Q   Median       3Q      Max
-15.1950  -3.8696   0.1914   4.8787  16.5907

Coefficients:
                           Estimate Std. Error t value Pr(>|t|)
(Intercept)                  66.761      2.504  26.665  < 2e-16 ***
ParticipationYes              4.922      2.128   2.313  0.02393 *
AttendanceHigh                6.534      2.278   2.868  0.00559 **
ConfidenceVery confident      6.614      1.975   3.349  0.00136 **
Social.mediaUp to 2 hours     3.904      1.932   2.021  0.04748 *
Social.mediaMore than 6      -2.437      3.666  -0.665  0.50863
Work.sphereRelated            4.545      2.364   1.923  0.05892 .
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 7.337 on 64 degrees of freedom
  (1 observation deleted due to missingness)
Multiple R-squared:  0.5001,  Adjusted R-squared:  0.4532
F-statistic: 10.67 on 6 and 64 DF,  p-value: 3.45e-08
```

Figure 1: Final reduced model

The resulting formula:

$$\begin{aligned}
&\text{GPA} = 66.761 \\
&+4.922 * (\text{ParticipationYes}) \\
&+6.534 * (\text{AttendanceHigh}) \\
&+6.614 * (\text{ConfidenceVery confident}) \\
&+3.904 * (\text{Social.mediaUp to 2 hours}) \\
&-2.437 * (\text{Social.mediaMore than 6 hours}) \\
&+4.545 * (\text{Work.sphereRelated})
\end{aligned}$$

As can be observed, the reduced model contains four predictors which are statistically significant at the 5-percent confidence level: Participation, Attendance, Confidence, Social Media Usage, and one predictor (Work Sphere Relevance) statistically significant at the 10-percent confidence level. (see Figure 1). The final model meets the linear regression assumptions of homoscedasticity and normal distribution of error terms (see Annex 3, Annex 4). Besides, examining multicollinearity and interactions between variables did not produce meaningful results.

Collectively, these five predictors account for 45.32% of the variability in observed GPA scores. More specifically, students with high attendance and participation in class activities and discussions show

an advantage in GPA by 6.5 and 4.9 points, respectively, compared to those who refuse to engage in class activities. Similarly, confidence in one's abilities produces a surplus of 6.6 points compared to low self-esteem. As for social media variables, less than two hours of usage is associated with a 3.9 higher score than 3-6 hours of social media interaction. Furthermore, working in a study-related sphere also contributes to an increased GPA of 4.5 points compared to an unrelated sphere.

The results of the study habits investigation perfectly align with the corresponding hypotheses. Both our findings and prior studies are confident that certain study behaviours, encompassing consistent attendance and active class participation, enhance grades (Cerna, 2015). Despite projections, an increase in study hours during the day did not significantly impact GPA. The reason for such an outcome may be the lack of effectiveness considerations while assessing the influence of learning hours. As expected, a higher estimation of self-efficacy fits into the paradigm of being a consistent and reliable academic performance predictor for both our study and theoretical materials in spite of different sample backgrounds (Zajacova, 2005). Another confirmed hypothesis anticipating a decline in academic success with more hours devoted to any social media supports the existing research on the negative consequences of social media multitasking (Lau, 2017).

Additionally, even though the absence of a job or its part-time nature is forecasted to secure a higher GPA score by the theoretical reference, our study fails to unveil any significant relationship between the aforementioned phenomena and academic performance (Stinebrickner, 2003). The cause of contradiction is considered to be the sample size being too small to convey scientifically approved conclusions. Nevertheless, our hypothesis with respect to study-related jobs is verified, proving students who combine fields of learning and working are more academically competitive.

Rejected hypotheses include the one regarding the positive effect of increased sleep duration on grades. Possibly, disunity with the preceding body of knowledge has arisen due to the subjectiveness of sleep hours evaluation in our research in comparison to objective measurement through digital devices in the reference study (Okano, 2019). Likewise, all social-demographic variables included in the model possess no statistical significance in predicting GPA, which nevertheless has a meaningful interpretation. For instance, the analysis concludes that academic success in KSE is gender-balanced, and consistent with study programs and living arrangements (see Annex 2).

6. Conclusion

6.1. Insights from the Model

In conclusion, our analysis has yielded valuable insights into the determinants of academic performance, focusing on GPA. We identified five significant predictors, including Participation (Yes/No), Attendance (High/Low), Confidence (Yes/No), Social Media Usage (Up to 2 hours/3-6 hours/More than 6 hours), and Work Sphere Relevance (Related/Not related), shedding light on their respective contributions to GPA scores. These findings underscore the importance of factors such as active class engagement, self-belief in one's academic capabilities, and limited social media use in achieving higher academic performance, emphasising the multifaceted nature of student success.

6.2. Policy Recommendations

This study's results hold significant implications for understanding academic performance and have broader applications in the field of education. By identifying key determinants of academic achievement, this research contributes to the enhancement of learning effectiveness and opens doors for future investigations across different domains. These findings have the potential to influence not only global educational practices but also locally, by informing strategies for the growth and development of KSE and ultimately contributing to the advancement of the field of education.

Therefore, we formulated recommended policy adjustments for the academic leadership board:

- Cultivation of study-related career path: the study estimates such an approach to be the optimal way to secure a more competitive GPA while working.
- Facilitation of appropriate internships: providing students with internships which aim specifically at acquired skills is estimated to be linked with higher levels of academic achievements.
- Design of syllabuses securing attendance and participation: assigning a significant syllabus grading proportion to regular attendance and active participation will prioritize these crucial success determinants among students.
- Introduction of a 10-15% buffer above 100 in all courses: this measure alleviates stress from individual assignments and boosts self-efficacy.

These recommendations, rooted in empirical evidence, offer a strategic pathway for enhancing learning effectiveness and shaping the future landscape of education not only in KSE but in the entire country.

6.3. Avenues for Future Research

Future research should prioritise increasing the sample size to ensure greater statistical power and more reliable conclusions. This larger sample would allow for a more in-depth analysis of currently insignificant variables, such as hobbies, sleep duration, and social-demographic factors, potentially revealing their impact on academic performance. Additionally, conducting a retrospective-prospective study is a promising avenue for understanding the long-term effects of policy changes or interventions on academic performance. By comparing the experiences of students before and after the implementation of specific policies or interventions, researchers can assess the effectiveness of these measures in improving academic success. This approach can provide valuable insights into the dynamics of educational policy and its impact on student outcomes, offering a comprehensive view of the efficacy of educational reforms over time.

7. References

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8. Annexes

8.1. Descriptive statistics

	N	Mean	St. Dev.	Min.	Max.
GPA	72	82.01		54.00	98.53
Participation	Yes: 48 No: 24				
Study.hours	1-6+ hours: 67 <1 hour: 5				
Attendance	Low: 14 High: 57 NA: 1				
Confidence	Not confident: 22 Very confident: 50				
Social.media	<2 hours: 32 3-6 hours: 35 6+ hours: 35				
Sleep	According to norm: 46 Not according to norm: 26				
Hobby	Sport: 14 Reading: 9 Both: 35 No: 14				
Study.program	Bachelors: 55 Masters: 17				
Gender	Female: 47 Male: 25				
Living.arrangement	By yourself: 12 On a KSE coliving / with KSE students: 14 On non-KSE coliving: 2 With a partner: 11 With non-KSE friends: 4 With family: 29				
Work.sphere	Not related: 59 Related: 13				

Annex 1: Discriptive statistics of all the variables in the full model

8.2. Results of our models

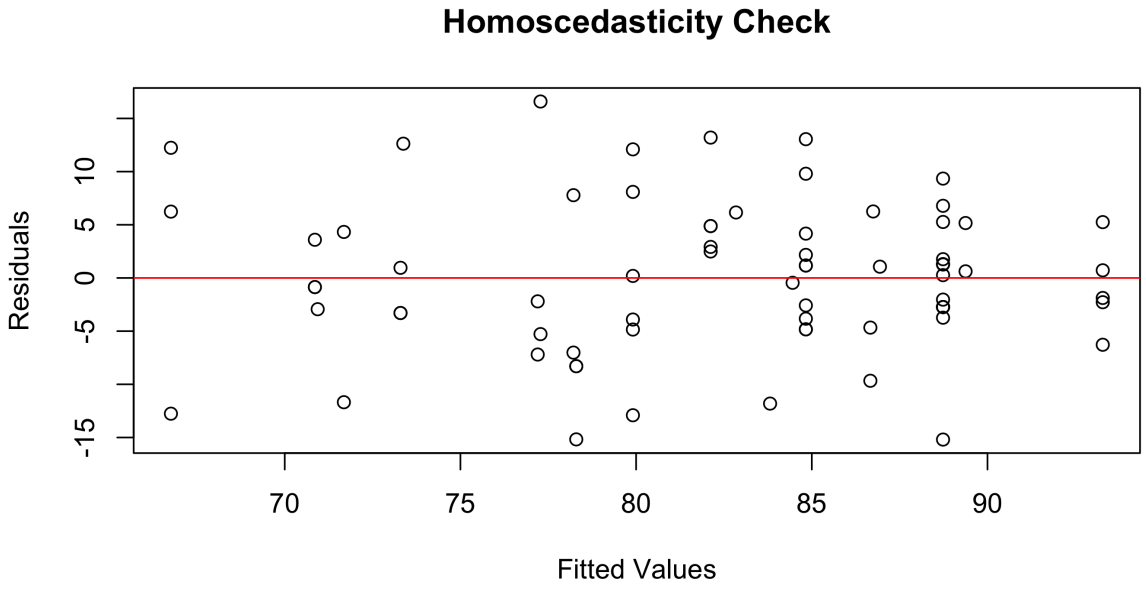
	Full Model	Final Reduced Model
Participation Yes	3.071 (2.396)	4.922** (2.128)
Study.hours Less than 1 hour	−1.939 (4.430)	
Attendance High	5.976** (2.556)	6.534*** (2.278)
Confidence Very confident	5.731** (2.178)	6.614*** (1.975)
Social.media Up to 2 hours	3.622* (1.966)	3.904** (1.932)
Social.media More than 6	−6.403 (4.362)	−2.437 (3.666)
Sleep Not according to norm	0.508 (2.053)	
Hobby No	6.274* (3.297)	
Hobby Reading	0.560 (4.022)	
Hobby Both	0.576 (2.859)	
Study.program Masters	3.826 (2.486)	
Gender Male	−3.554 (2.262)	
Living.arrangement On coliving / With non-KSE students	3.900 (6.290)	
Living.arrangement On KSE coliving / With other KSE students	3.440 (3.025)	
Living.arrangement With a partner	0.637 (3.665)	
Living.arrangement With non-KSE friends	6.183 (4.828)	
Living.arrangement With parents / family members	0.628 (2.740)	
Work.sphere Related	5.249** (2.590)	4.545* (2.634)
Constant	66.648*** (3.961)	66.761*** (2.504)
Observations	72	72

R2	0.615	0.500
Adjusted R2	0.482	0.453
Residual Std. Error	$7.139 (\mathrm{df} = 52)$	$7.337 (\mathrm{df} = 64)$
F Statistic	4.623^{***} $(\mathrm{df} = 18; 52)$	10.671^{***} $(\mathrm{df} = 6; 64)$

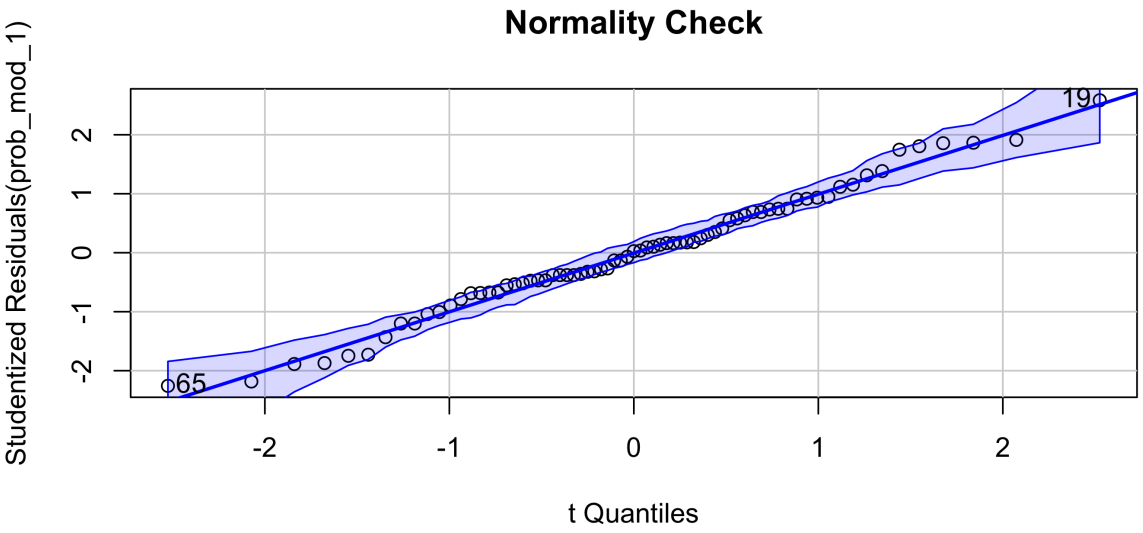
Note: $^{*}p < 0.1; ^{**}p < 0.05; ^{***}p < 0.01$

Annex 2: Detailed comparison of key properties of the initial model and the final reduced model

8.3. Verification of regression analysis assumptions



Annex 3: Fitted vs Residuals plot



Annex 4: Q-Q plot