pleted thesis, as well as on the recommendation from the Komsomol and party organizations. Completion of a PhD was a prerequisite for building an academic career, and PhDs were assigned to work in universities or research institutes.

PhD programs in the sectoral context were determined by the needs of the industry. Accordingly, the dominant share of PhD students was in technical specialties, and there was only a small proportion of PhDs in the humanities.

Modern Russia - an overview

With the collapse of the Soviet Union, a transformation of PhD programs began. From the mid-1990s there was a significant increase in the total number of PhD students, which continued until 2010, and in many respects the growth in these 15 years was determined by the emergence and explosive growth of the fee-paying segment of PhD programs; previously all students studied at the state's expense. Considering this as a revenue stream, universities in many cases accepted university graduates with very poor training and who were not interested in an academic career. In 2015, every third PhD student was tuition-paying.

It must be understood that this expansion occurred during the most difficult period for universities. The scholarship, which state-funded PhD students continued to receive, was no longer enough to survive on. PhD students began to work en masse, full-time and often in areas that had nothing to do with their studies.

During this period, the number of universities accepting PhD students also increased (from 398 in 1990 to 748 in 2010), while the number of research institutes that train PhD students decreased both in relative and absolute terms (from 834 to 809). The growth of the "university" component of PhD programs was because a PhD gave its holders higher social (and not just academic) status and therefore was in demand by those who were not going to pursue career in science or education. In addition, fee-paying PhD students were a source of additional income for universities. Universities began to tolerate the combination of work and study (and what else could they do?), taking into account that neither the teaching salary, let alone the scholarship, provided PhD students with a decent existence, and they simply had to look for additional sources of income. Today, the PhD scholarship remains very low, however, there are more opportunities for graduate students to earn additional income through participation in research projects and teaching. Despite the increase in the number of PhD students, the share who defend their theses remains low.

With the change of priorities in industrial policy, the structure by discipline has undergone marked changes: technical sciences still remain the most popular, although they have noticeably lost ground. Judging by the indicators of the share of graduates from PhD programs who defended their theses, the key suppliers of PhDs to the Russian market were in the areas of technical, economic, and medical sciences (in 2015, 24%, 13% and 16%, respectively).

The sectoral structure of state-funded and fee-paying PhD students also differs. There is a higher graduation rate for state-funded PhDs, with an emphasis on technical and natural sciences. Fee-paying PhDs are concentrated in economics and law, that is, in those areas that are most in demand by the non-academic labour market and do not require graduate students to work in laboratories or with equipment, making the combination of thesis work and employment more practical. In 2015, PhD students of technical specialties accounted for 29% of the state-funded cohort and only 14% of the fee-paying cohort; for economists 11% and 29%, and lawyers 4% and 13%, respectively.

Although today the structure of PhD programs has changed in comparison with the Soviet period, these changes are less related to the demands of the academic market. To a greater extent, they are determined by demand from the non-academic labor market and by supply from universities. This is dictated by the incentives for higher education institutions to have large PhD programs that attract state and student funding. This results in many systemic problems for Russian PhD programs, including a low percentage of defenses, quality problems, and the low number of students interested in pursuing an academic career.

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Determinants of doctoral degree aspirations: insights from a nationally representative panel study

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The number of doctoral enrollments and the number of doctoral degrees awarded annually is growing worldwide

[1]. However, the opposite tendency is found in Russia. The number of doctoral students is steadily declining and has been almost halved over the last 10 years from 157,437 in 2010 to 84,265 in 2019 [2]. The proportion of students who enroll in doctoral programs immediately after their graduation from a University has also decreased remarkably from 31% in 2010 to 5% in 2019 [3].

This raises concerns over the potential negative effects that such an outflow of talented graduates to the non-academic labor market might have on universities. For instance, it might further complicate the replacement and recruitment of research and teaching staff who are already struggling to compete with more lucrative career opportunities outside academia.

Given these concerns, it is especially important to identify the determinants of doctoral degree aspirations and to understand the difference in the profiles of students who decide to leave university after undergraduate studies and those who decide to enroll in doctoral programs. While the factors determining the chances of successful completion of a doctoral program in Russia have been studied [4], little is known about the factors determining the decision to enroll in such programs in the first place. Our study is intended to fill this gap by analyzing unique data from a nationally representative longitudinal study "Trajectories in Education and Careers" (TrEC) [5]. TrEC has been tracking 4,400 students from 42 Russian regions since 2011. We focus on the educational outcomes of students along with key socio-demographic characteristics and their association with plans to obtain a doctoral degree.

The educational outcomes are measured by PISA scores [6]. The participants took PISA tests in 2012 when they were 15 years old. Note that academic achievements measured by such standardized tests are known to be stable over time and correlate highly with important life outcomes.
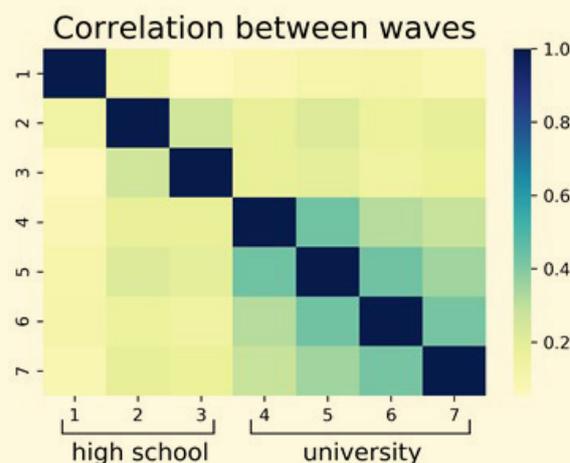
Student plans to receive a doctoral degree

During the seven waves of TrEC survey students were asked about the highest academic degree they want to achieve. We focus on comparing students who indicated that they want to receive a doctoral degree with those who chose lower levels. First, we assessed the evolution and consistency of students' aspirations over time. The share of those who plan to obtain a doctoral degree steadily increases from 1.6% in the first wave (ninth grade in high school) to 5% in the seventh wave (fourth year of their undergraduate study).

Figure 1 shows that during high school the answers to the question regarding doctoral aspirations are not consistent. Students often change their minds which is not surprising given the fact that the majority of schoolchildren choose a university where they want to continue their studies only during their last year of high school studies and doctoral education is far in the future. As a result, the answers in the ninth grade are only weakly correlated with the answers in the 4th year of university (Pearson's r = 0.09, P < 10-9) and could be considered as non-attitudes. However, starting from the first year of university, the answers became more stable, with correlation ranging from r = 0.18 to r = 0.44 for consecutive years.

Figure 1. Correlations between answers of respondents at different waves of data collection

Who plans to go to doctoral study?

We then study the factors that are associated with plans to receive a doctoral degree. We report the results obtained using the answers from the last wave, but the results were qualitatively the same for all of the university waves.

We check the relationship between the factors and students plans, and we find that the educational outcomes of a student, their socio-economic status and the highest level of their parents' education predicts doctoral aspirations. We also find that these plans are independent of gender. Continuous variables such as educational outcomes and socio-economic status were standardized to have a mean of zero and a standard deviation of one.

We also use a logistic regression model to predict doctoral aspirations (Table 1). We find that the strongest predictor is the educational outcome of the student: a one standard deviation increase almost doubles the chances of planning for a doctoral degree. The chances are also increased for students with higher socio-economic status. Intriguingly, the father's, but not mother's, university degree is also predictive of higher chances of planning for a doctoral degree.

Table 1. Binary logistic regression predicting students plans

Variables	Model 1	Model 2	Model3
Educational outcomes	1.903 [1.517; 2.386] (P<10⁻³)	1.984 [1.593; 2.470] P<10⁻³	1.894 [1.488; 2.411] P<10⁻³

Variables	Model 1	Model 2	Model3
SES	1.886 [1.266; 2.811] (P = 0.002)	2.108 [1.390; 3.197] (P < 10^{-3})	1.475[0.905; 2.405] P = 0.118
Mother having university degree or higher		1.130 [0.720; 1.773] (P = 0.594)	0.986 [0.598; 1.627] P = 0.959
Father having university degree or higher			1.734 [1.061; 2.835] P = 0.028

Higher performing students are more likely to pursue doctoral studies, which holds after controlling for socio-economic status and parental education. Our findings indicate that the decrease in the number of enrollments in doctoral programs could probably be explained by the reduced interest among lower performing students and that doctoral education retains the ability to attract the strongest students. Further studies, however, are needed in order to determine if these aspirations are translated into actual enrollment.

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Collective or individual enterprise? Who provides academic support to doctoral students at Russian universities?

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Introduction

Most national systems of doctoral education have experienced significant institutional transformations over the last twenty five years in response to the global challenges of massification, internationalization and marketization [1, 2]. One of the most prominent changes was the global shift from the "master-apprentice" model of doctoral education, based on dyadic communication between doctoral students and their supervisors, towards a structured model, which establishes shared models of doctoral student support and control, and a transparent system of milestones for doctoral students. The main aim of this global shift was to increase the completion rates, which were significantly lower compared to other levels of higher education, to increase the quality of doctoral theses and to decrease the average time-to-degree, through establishing a complex system of academic support to doctoral students. While there is significant variation in the implementation of this model in different contexts, most European systems of doctoral education now demonstrate the main attributes of the structured model such as shared models of supervision and special institutional structures (graduate or doctoral schools) which are responsible for the implementation of doctoral programs, explicit and transparent systems of milestones and requirements for doctoral students [3].