EMPLOYMENT CONSEQUENCES OF SCHOOL-EXIT MULTIPLE CHOICE EXAMINATION IN THE KYRGYZ REPUBLIC

By

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Abstract

The issues related to school education are particularly relevant for Kyrgyzstan as the country implements a series of reforms in this sphere. In this study, I examine the causal effect of participation in the school-exit National Unified Testing (NUT) on employment outcomes in the Kyrgyz Republic. I exploit the 2013 policy change that removed the Uzbek language option from the NUT as a source of exogenous variation in the test participation. Using a Difference-in-Differences (DiD) framework and survey data, I find that non-participation in the exam increases employment, especially in the agricultural sector. Specifically, non-participation in the test raises the probability of being employed by 21.6 percentage points and employment in agriculture by 20.8 percentage points. My results are statistically significant and robust across all model specifications. These findings suggest investing in agricultural vocational schools for students who do not take the NUT and improving access to tertiary education based on the principle of equality of opportunity for those pursuing higher education.

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1 Introduction

Education is one of the key drivers of economic opportunities, and the transition from school to work is a critical stage in shaping individuals' long-term outcomes. In many countries, school-exit exams play a key role in shaping access to higher education or facilitating early labor market integration *via* signaling academic achievement to institutions and employers alike. A better understanding of how such assessment systems influence employment outcomes can inform future education policies.

The question of education policies is particularly timely for Kyrgyzstan, where education reforms remain a central topic in both policy and public discourse. The country has been undertaking a series of reforms, which have extended to school examinations, where most of the exams are developed or sponsored by the United States Agency for International Development (USAID). Therefore, the effects of school exams funded by USAID are especially relevant following the recent suspension of the program. For instance, a similar USAID-funded exam "Altyn Tamga" has already been eliminated in March 2025 due to funding constraints.[2] The school-exit examination in Kyrgyzstan, called the National Unified Testing (NUT), is also supported by USAID and thus faces a similar threat. Given this context, the evaluation of whether participation in the NUT yields significant labor market effects can inform decisions whether the exam should be sustained through domestic funding or reconsidered entirely.

In this paper, I analyze whether participation in the NUT by graduating students in schools across Kyrgyzstan affects their employment status in the years following graduation. I find that withdrawal from the exam leads to increased employment. This finding is unexpected because it contrasts with the existing literature, which suggests a positive relationship between

[2] The "Altyn Tamga" examination was developed as a standardized test to assess the academic knowledge of candidates eligible for the high school diploma with highest honors. The exam was suspended on March 5, 2025, following the termination of USAID programs initiated under the Trump Administration (24.kg).

school-exit test participation and employment outcomes (Dee and Jacob, 2006; Backes-Gellner and Veen, 2008; Baker & Lang, 2013). Indeed, the results may be counterintuitive, as graduation exams are typically perceived as signaling mechanisms for student quality to employers or as gateways to tertiary education, both of which are associated with improved employment prospects (Holme et al., 2010; Piopiunik et al., 2013; Schwerdt and Woessmann, 2017).

In Section 2, I briefly discuss related literature. In particular, in Section 2.1, I review empirical literature on the effects of school graduation exams on employment, while highlighting both supportive findings and contrasting perspectives. The ambiguous direction implies that the exams' effect and the extent of this effect remain an open question.

Moreover, the majority of existing literature is focused on WEIRD countries (Western, Educated, Industrialized, Rich, Democratic). To address this gap, in Section 2.2, I review studies specific to Kyrgyzstan. While several papers examine effects of standardized testing on various schooling and post-secondary outcomes in Kyrgyzstan, none directly estimate the causal effect of school-exit exams on employment outcomes. This lack of evidence and a predominant focus on Western economies highlight the potential to contribute new insights into the labor market implications of educational assessment policies in a post-Soviet transitional economy setting. It also allows for the evaluation of external validity of prior empirical findings.

In Section 3, I outline the institutional setting. Crucially, it features a policy reform that I exploit to identify the causal effect of test participation on employment outcome. Since its establishment, the NUT was conducted in three languages most spoken in Kyrgyzstan – Kyrgyz, Russian, and Uzbek. However, in 2013, the Uzbek language option was eliminated, leaving students with only Kyrgyz or Russian as language choices. I use this policy reform to analyze the causal effect of participation in the NUT on employment status, using students from

Uzbek-medium schools as a plausibly valid treated group and students from Kyrgyz/Russian-medium schools as a plausibly valid control group.

In Section 4, I describe data, its measurement, and the details of my final sample. For this study, I use the data from Life in Kyrgyzstan (LiK) questionnaires, a nationally representative survey that collects comprehensive data on various socioeconomic dimensions, including education and employment. My empirical analysis is conducted on a cross-sectional sample.

In Section 5, I discuss empirical design and identification strategy. In my analysis, I adopt a Difference-in-Differences (DiD) approach. For this approach to provide an unbiased estimate of the policy impact, the main requirement is the presence of parallel trends. I provide supportive evidence of such trends using graphical illustrations and formal statistical tests.

In Section 6, I present and discuss in detail the main results. First, I present the evidence of existing correlation between the NUT uptake and university attendance. Second, I present the evidence of existing correlation between the NUT uptake and the variable capturing the policy change. Third, I present estimates capturing the causal effect of the policy change on employment outcome. While I find the policy impact to be counterintuitively positive, most of this effect comes from the employment on a farm.

In Section 7, I discuss policy implications of my findings.

Finally, Section 8 concludes.

I contribute to the existing literature in three ways. First, I complement empirical literature on the causal effects of school-exit examinations on employment outcomes. Existing studies diverge in their findings. Second, I add to the literature on the transition from school to work within the context of Kyrgyzstan, which has received limited scholarly attention. Third, I use a novel DiD approach and the "Life in Kyrgyzstan" dataset that have never been previously used to study similar effects.

2 Literature Review

In this section, I provide a critical review of related literature. First, I review empirical studies on the effects of graduation exams on employment outcomes. Second, I describe the state of youth employment in Kyrgyzstan and review research specific to the country.

2.1 Exit Exams and Employment: Evidence from Global Contexts

The evidence on the ultimate effect of school-exit exams on employment is inconclusive and leaves room for further research. On the one hand, proponents of high-stakes assessments suggest that signaling value of exams is crucial for translating educational achievement into labor market success (Piopiunik et al., 2013; Schwerdt and Woessmann, 2017). They assume that a high school graduate with a diploma who completed high-stakes school-leaving exams has mastered a specific set of skills. In turn, this trait serves as a signal of graduates' quality to employers and improves their post-secondary outcomes.

However, the labor market effect of exam participation differs when taking into account the heterogeneity in race/ethnicity and gender. For example, Dee and Jacob (2006) establish that in the U.S., exit exams decrease employment for black males in their twenties by 0.9 percent and increase employment for white females and Hispanic females by 0.09 percent and 5 percent, respectively. However, the authors assume that respondents are subject to the mandatory exams based on their state of birth, thereby disregarding potential migration. This drawback raises concerns about the validity of their identification strategy. A more direct measure of respondents' affiliation with schools covered by the mandatory exams would strengthen the analysis.

Similar to Dee and Jacob (2006), Holme et al. (2010) use two-way fixed effects (TWFE) models and find that school-exit exams increase employment rate by 3 percent and 1 percent for the U.S.-born Hispanic females and black females, respectively. For the U.S.-born black

males, however, they reveal a 1 percent decrease in the employment rate. Importantly, they conclude that school diplomas serve as a signal in the marketplace, which is in line with the signaling argument. These findings suggest that the school-exit exams play a critical role in shaping early labor market outcomes, albeit in a heterogeneous manner. Nonetheless, given the decentralized nature of the U.S. education policy and racially stratified labor markets, these findings may not generalize to transition or post-Soviet economies.

Evidence from other developed countries also suggests that graduation exams have positive effects on labor market outcomes. In Germany, participation in centralized exams, which are typically standardized and more rigorous than local or school-based assessments, are associated with lower unemployment, especially for students entering the labor market directly after school (Backes-Gellner and Veen, 2008). Moreover, individuals who graduated in German states with centralized exit exams, which are similar to the NUT, are approximately 2.4 percentage points less likely to be registered as unemployed compared to their counterparts from states with local exams (Piopiunik et al., 2013). These findings support the notion that school-leaving assessments improve employment prospects, especially in rigid labor markets such as Germany, where their impact extends beyond earnings and also influences employment status. However, these results should be interpreted with caution since both papers rely on OLS estimation. Therefore, these results provide limited insight into the causal impact of exams.

In the context of developing countries, the exam effects are comparable to those of developed economies. For Bangladesh, Sulaiman (2012) establishes that when exam standards are high, passing the exam increases the likelihood of formal employment by 13 percentage points for males and 7 percentage points for females. However, if exam standards are lowered, these employment gains disappear. The diminished effect over time suggests the importance of maintaining rigorous standards to achieve better employment outcomes.

On the other hand, critics of high-stakes assessments claim that school-exit exams have unintended potential for a negative effect. High-stakes graduation exams lead to higher dropout rates and divert the teaching focus towards test preparation, often at the expense of a broader curriculum content (Debray, 2005; Vogler, 2006; Vogler, 2008; Holme, 2008). These changes decrease the quality of forthcoming post-secondary students and workers, thereby disadvantaging them in higher education or labor markets. Dee and Jacob (2006) find that exit exams increase the dropout rate by 5.5 percent in the context of the U.S. However, only one study empirically proves that exit exams result in a reduced employment probability for respondents across races and gender, yet the estimates are not robust (Dee, 2003).

The remaining studies report inconclusive results. Using TWFE models, Baker and Lang (2013) find neither significant nor consistent employment effects. Similarly, Warren et al. (2008) reveal no evidence that U.S. state high school exit exams affect labor force status among respondents in their twenties. In contrast to Dee and Jacob (2006) and Holme et al. (2010), they suggest that the effect does not appear to vary by race/ethnicity. Furthermore, they establish that those exams do not appear to widen gaps in labor force outcomes between exam takers and non-takers, thereby concluding that the exams do nothing to enhance the labor market value of the high school diploma. These findings call into question the signaling argument raised in the aforementioned papers.

Finally, the effect of school-exit exams extends beyond employment status. Specifically, such exams also appear to shape labor market outcomes even for those who are employed. In general, the evidence points to a positive effect (Bishop et al., 2000; Bishop and Mane, 2001). For instance, Martorell (2005) employs a regression discontinuity design (RDD) and finds that, for graduated students in Texas who demonstrate consistent labor market activity, barely passing the exam is associated with earnings approximately 4 percent higher in the years observed after high school compared to barely failing. However, this earnings

advantage is temporary, appearing several years after high school and disappearing by year six. This might suggest that the signaling value of the diploma diminishes over time as employers learn about workers' actual productivity and other traits that are beyond academic achievement. While this reasoning may explain statistically insignificant results for a general employment probability in previous studies, it challenges the conclusion by Holme et al. (2010), who emphasize the persistent signaling function of such examinations.

That way, the mixed evidence in the existing literature underscores the importance of context in assessing labor market impacts of school-exit exams. To date, no empirical studies have examined these effects in the context of transitioning or post-Soviet economies. Finally, previous empirical research predominantly relies on OLS or TWFE models, with limited attention given to the DiD approach.

2.2 Exit Exams and Employment in the Context of Kyrgyzstan

In Kyrgyzstan, young job seekers face challenges in the labor market. Every year, approximately 100,000 young people enter the Kyrgyz labor market, but only a fraction finds formal employment (Pouchkin and Rask, 2014). In 2017, only 23 percent of employed youth had a written contract, and many worked in low-security or low-wage positions (Tilekeyev et al., 2019). Pouchkin and Rask (2014) report low uptake of public employment services and limited reach of government training initiatives, especially in rural areas. These structural barriers highlight the need for more inclusive and effective employment policies targeting youth.

While there are no studies that explicitly investigate the relationship between the NUT uptake and employment status in Kyrgyzstan, several works explore key factors affecting youth employment outcomes in the country. These factors include perceived value of educational

credentials, prevalence of informal hiring, and mismatch between educational attainment and job requirements.

The path from secondary school to labor market can be referred to as the school-to-work transition (STWT) and is complicated by the country's dual legacy of high education attainment and a relatively weak labor market absorption. Kyrgyzstan has a high rate of secondary education enrollment inherited from the Soviet era and a rapid growth in tertiary education institutions following independence (Karymshakov and Sulaimanova, 2018). However, the realities of the country do not necessarily support empirical works positing that higher education yields positive employment outcomes. For instance, in his review on the establishment of the NUT in Kyrgyzstan, Shamatov (2012) reveals that while higher education broadens employment prospects, it does not imply that youth with higher education qualifications necessarily find jobs that match their skills. I argue that this disconnect might stem from weak signaling mechanisms and the widespread perception among employers that degrees and test scores may not reflect real competence.

In particular, educational qualifications might not always serve as reliable indicators of competence in the labor market due to corruption and informal practices in the education system. Employers often bypass formal qualifications or test credentials and rely instead on informal networks for recruitment, which diminishes the role of high-stakes examinations in determining labor market outcomes for younger individuals. Even in the formal sector, hiring decisions do not consistently adhere to merit-based processes (Baumann et al., 2013). Consequently, the NUT's role may be limited not by its design but by structural factors that reduce its signaling value in both formal and informal employment settings.

The value of exam credentials is also weakened by overeducation. Karymshakov and Sulaimanova (2018) examine the prevalence of overeducation among Kyrgyz youth and find that its significant portion is employed in jobs for which they are considered overqualified.

These findings suggest that tertiary education, which is mediated by the NUT, may not fully capture the competencies employers look for in young job seekers, thereby affecting their employment outcomes.

The aforementioned Kyrgyzstan-related studies provide valuable descriptive and qualitative insights. However, their lack of econometric analysis limits the ability to quantify the relationship between exam participation and employment outcomes, let alone identify causal links between them.

Thus, my first contribution to the literature relates to extending the existing research on the causal effects of graduation exams on employment by testing the external validity of findings, which were predominantly derived from Western and developed economies. My second and third contributions relate to complementing the literature on the transition from school to work within the context of Kyrgyzstan and developing a novel DiD approach using a new dataset to study the relationship between exam participation and employment outcomes in the country, respectively. Regarding the former, transition economies, including Kyrgyzstan, are largely overlooked in the related literature. Regarding the latter, there are no previous studies that have addressed a similar question using this methodology.

3 Institutional Setting

The NUT was established in 2002 and takes the form of a standardized multiple-choice exam. It was developed by the Ministry of Education of the Kyrgyz Republic in cooperation with USAID and aims to objectively assess students' application of school material across various subjects, including mandatory Math and Kyrgyz or Russian languages and optional subject-specific tests. The objectivity of the test lies in the fact that it complements traditional school-based exams, which are often subject to bias and corruption. Moreover, the questions in the NUT are designed not to test mere memorization but to evaluate analytical capabilities and logical thinking of graduates, as opposed to the traditional testing forms inherited from the Soviet era, which required memorizing facts, reciting texts, and recalling essays, translations, dictations, and subject-specific rules from memory, rather than developing critical thinking skills (Maksutova, 2004).

Additionally, the exam plays a pivotal role in higher education access and labor market entry. Apart from the signaling mechanism outlined in the related literature (Holme et al., 2010; Piopiunik et al., 2013; Schwerdt and Woessmann, 2017), the context of the NUT introduces an additional mechanism of gatekeeping. Since 2012, passing the NUT has become a requirement for university admission in Kyrgyzstan, replacing or supplementing traditional entrance exams. This requirement applies to all types of universities – public and private – regardless of study mode – part-time or full-time, with or without tuition waivers – thereby standardizing access to tertiary education (Rysalieva, 2011). In this context, the NUT functions as a gatekeeper. By conditioning access to university on exam success, it reshapes the timing and likelihood of tertiary education, which in turn affects the timing and likelihood of early entry into the labor market.

Importantly, the institutional setting features a policy reform that I exploit to identify the causal effect of test participation on employment outcome. Since its establishment, the NUT

was conducted annually in three languages most spoken in Kyrgyzstan – Kyrgyz, Russian, and Uzbek. Uzbeks and Russians represent significant minority groups in the country, amounting to 14.81% and 4.97% of the population, respectively (National Statistical Committee of the Kyrgyz Republic, 2022). However, in 2013, the option to take the exam in Uzbek was officially eliminated, leaving students with only Kyrgyz or Russian as language choices (Benliyan, 2013; 24.kg, 2013; Vesti.kg, 2013). This change particularly affected students from approximately 260 Uzbek-medium schools, including 91 fully Uzbek-taught schools, which are primarily located in southern and rural areas near the Uzbekistan border. I exploit this 2013 policy change as an exogenous source of variation in the exam participation.

The elimination of Uzbek as a test language reflects its little institutional value in Kyrgyzstan, where Kyrgyz holds the status of the state language and Russian holds the status of the official language. In contrast, Uzbek lacks such a formal recognition, hence its removal from the NUT. The government's decision was driven by considerations of fiscal efficiency, concluding that the budget should not be spent on translating test materials into a language that is not officially recognized in the country (K-News, 2012). This rationale suggests that the reform was not motivated by educational or labor market objectives, nor by interethnic political tensions, which supports its exogeneity in the context of my research.

Consequently, the elimination of Uzbek language may have discouraged some Uzbek-speaking students from taking the test, either due to language barriers or increased difficulty in preparation. This policy reform allows me to study the causal effect of test-taking on employment outcome by defining students from Uzbek-medium schools as the treatment group and students from Kyrgyz/Russian-medium schools as the control group.

4 Data

In this section, I present the dataset, the measurement of key variables, and descriptive statistics.

4.1 Data and Measurement

I use data from the LiK questionnaires, a nationally representative panel household survey that collects comprehensive data on the living conditions of individuals and households across Kyrgyzstan. The survey was conducted in six waves in 2010, 2011, 2012, 2013, 2016, and 2019.

I use all six waves of the survey but introduce restrictions that reflect the focus on post-school labor market entry among recent graduates. First, I restrict the sample to respondents aged 20-29, analogous to Dee and Jacob (2006) and Warren et al. (2008). Second, I limit the sample to those individuals who graduated in or before 2019, which is the latest survey year. Third, I only keep the latest available observation of every interviewed respondent to address missing values in earlier waves and capture the most recent value of given outcome variable, thereby accounting for the possibility that some respondents might have attended university before entering the labor market. Therefore, in my final sample, each individual is observed once with respect to the cohort dummy. Thus, although the LiK dataset is originally a panel, I conduct the analysis on a cross-sectional sample.

My outcome variable is a binary indicator of whether an individual is employed or not at the time of the survey. In specific, the related questions in the questionnaire are: “During the past 7 days, have you worked for someone who is not a member of your household, *e.g.*, for an enterprise, company, farm, the government, or any other individual?” and “In the past 7 days, have you done any farming, fishing, hunting, or gathering of fruit, berries, nuts or other products?”

When constructing my final sample, I impose three assumptions. First, since the year of high school graduation is not observed, I estimate it based on respondents' age following the approach used in prior studies (Dee, 2003; Dee & Jacob, 2006; Baker & Lang, 2013). However, this approach implies that there are no grade repetition and skipping within the sample. Second, since school location is observed only in 2012, I assume that respondents' school location remains the same across all years and assign the 2012 value to all other years, consistent with the same prior studies. Third, since the school language variable is observed only in 2012, I assume that respondents' school language remains the same across all years and assign the 2012 value to all other years. Despite data limitations, these assumptions ensure consistency in the data.

4.2 Descriptive Statistics

Table 1 shows descriptive statistics. Overall, there are 348 and 1890 respondents with respect to the employment outcome variable from Uzbek- and Kyrgyz/Russian-medium schools, respectively. On average, respondents from the control group have a lower employment rate (35.1 percent) compared to treated individuals (41.3 percent). In contrast, 41.7 percent of respondents from Kyrgyz/Russian-medium schools participated in the NUT, as opposed to 19.3 percent among those from Uzbek-medium schools. Consequently, a higher proportion of respondents in the control group have at least a bachelor's degree (16.9 percent), while this is true for only 4.7 percent of the treated respondents. As expected, the majority ethnicity in the treatment group is Uzbek (86.5 percent), while in the control group it is Kyrgyz (80.9 percent). The gender distribution is similar between the treatment and control groups – 49.1 percent and 50.3 percent of males, respectively.

Building on the data, I turn to outlining the empirical strategy in Section 5.

5 Empirical Design and Identification Strategy

In this section, I present the empirical design that I adopt in answering my research question of whether participation in the NUT affects graduates' employment status in the Kyrgyz Republic. In Section 5.1, I present the model specification and estimation approach that I exploit to examine the relationship between the policy impact and employment outcome. In Section 5.2, I discuss the construction of comparison groups and the identification strategy. I also show that the estimated coefficient of interest should be interpreted as the Average Treatment Effect on the Treated (ATET). Finally, I discuss the key identification assumption that is required to estimate the causal effect of the policy on employment status.

5.1 Empirical Strategy

A multivariate ordinary least squares (OLS) regression would likely yield biased estimates of the causal effect of test taking on the employment status. The OLS model might be less susceptible to reversed causality and measurement error concerns. The temporal ordering, where participation in the NUT necessarily precedes employment due to administrative timing, helps mitigate concerns about reverse causality. A measurement error stemming from misreporting issues in the LiK questionnaires is not expected to severely bias results. Specifically, misreporting of respondents' employment status would not systematically bias the OLS estimates, while misreporting of participation in the NUT would result in the attenuation bias, which biases the estimated effect towards zero and thus makes the findings more conservative. However, within my context, the OLS model may suffer substantially from an omitted variables (OV) bias. A key source of the OV bias could be unobserved covariates such as respondents' innate ability, which is likely to be positively correlated with both exam participation and employment outcomes. As a result, the OLS estimates may be upward biased, overstating the true effect of the exam participation on employment.

Within my setting, a solution to the endogeneity problem is to utilize a DiD framework, which is especially relevant when studying impacts of policy reforms, as is the case here. Therefore, to assess the effects of the 2013 Uzbek language policy change, I use a DiD identification strategy for pooled cross-sectional data. I use a similar set of individual-level characteristics that is used in the related literature (Joensen and Nielsen, 2009; Clark and Martorell, 2014), but extend the model by incorporating additional control variables that pertain to the LiK questionnaires and are relevant for the NUT context.

Using pooled cross-sectional data on individuals aged 20-29 and who belong to the cohort graduated prior to or in 2019, I estimate model (1):

$$(1)\ Y_i = \beta_0 + \beta_1 after_i + \beta_2 uzbek_i + \beta_3 policy_i + \mathbf{X_i'\beta_4} + \mathbf{R_i'\beta_5} + \mathbf{S_i'\beta_6} + \varepsilon_i,$$

where $policy_i = (after_i \times uzbek_i)$ and i denotes individuals. The variable of interest, $policy_i$, is thus the interaction term between a respondent being in an exposed cohort, *i.e.*, those who graduated from high school in 2013 or later, and having a secondary school taught in Uzbek language. In my final sample, I observe each individual once, either belonging to the pre- or post-policy cohorts, hence only index i.

Before analyzing the main outcome variable, I first test whether the policy had a statistically and economically significant effect on the NUT uptake, *i.e.*, first stage:

$$nut_i = \beta_0 + \beta_1 after_i + \beta_2 uzbek_i + \beta_3 policy_i + \mathbf{X_i'\beta_4} + \mathbf{R_i'\beta_5} + \mathbf{S_i'\beta_6} + \varepsilon_i,$$

where nut_i is a binary indicator of whether a respondent took the NUT upon completing grade 11 of high school.

Then, I analyze whether the policy had a statistically and economically significant effect on the employment outcome, *i.e.*, reduced form:

$$employment_i = \beta_0 + \beta_1 after_i + \beta_2 uzbek_i + \beta_3 policy_i + \mathbf{X_i'\beta_4} + \mathbf{R_i'\beta_5} + \mathbf{S_i'\beta_6} + \varepsilon_i,$$

where $employment_i$ is a binary indicator of whether a respondent is employed at the time of the survey.

Finally, to assess the sectoral source of the effect, I use a binary indicator for farm employment as the outcome variable in model (1):

$$farm\_employment_i = \beta_0 + \beta_1 after_i + \beta_2 uzbek_i + \beta_3 policy_i + \mathbf{X_i'}\boldsymbol{\beta_4} + \mathbf{R_i'}\boldsymbol{\beta_5} + \mathbf{S_i'}\boldsymbol{\beta_6} + \varepsilon_i.$$

Overall, I run ten model specifications. In some specifications, I control for a vector of individual observable characteristics $\mathbf{X_i'}$, which includes a full set of age dummies, male binary variable, marital status binary variable, ethnicity dummies, and native language dummies. I additionally control for region-of-birth fixed effects $\mathbf{R_i'}$ and school location fixed effects $\mathbf{S_i'}$. In an alternative model specification, I restrict the sample to Uzbek-concentrated regions only – Osh, Jalal-Abad, Batken, and Osh city – to better isolate the treatment effect. I also estimate specifications that exclude individuals who graduated from high school in 2012, individuals born outside Kyrgyzstan, and those from Russian-taught schools. The exclusion of the year 2012 is motivated by its status as a transitional year during which the NUT became a formal requirement for entry into tertiary education. The exclusion of respondents born outside of Kyrgyzstan is motivated by systematic differences in educational systems, particularly if they did not return to the country before completing secondary education. Lastly, the exclusion of respondents from Russian-taught schools is motivated by the potential systematic differences in curriculum and learning intensity, which could introduce heterogeneity not directly related to the policy change.

In model (1), β_1 captures the average difference in the NUT participation and employment probabilities between pre- and post-policy cohorts among students from Kyrgyz/Russian-medium schools; β_2 captures the average difference in the given outcome probabilities between students from Uzbek- and Kyrgyz/Russian-medium schools in the pre-

policy cohorts; β_3 captures whether the difference between cohorts for a given outcome is different for students from Uzbek- and Kyrgyz/Russian-medium schools, *i.e.*, how much more or less the outcome changed for Uzbek-taught students than it did for non-Uzbek-taught students. In the reduced form, β_3 captures the causal effect of the policy change on the employment probability. Standard errors are clustered at the high-school-graduation-year level to account for the within-cohort correlation of errors.

To assess whether the NUT functions as a gatekeeping mechanism for access to tertiary education, despite being a mandatory prerequisite only since 2012, I estimate an auxiliary model (2) using OLS:

$$(2)\ university_i = \beta_0 + \beta_1 nut_i + \mathbf{X_i'\beta_2} + \mathbf{R_i'\beta_3} + \mathbf{S_i'\beta_4} + v_i,$$

where $university_i$, is a binary indicator of whether a respondent graduated from a university program.

5.2 Identification

Since the 2013 policy change eliminated the option to take the NUT in Uzbek language, I define the treated group as respondents who studied in and graduated from Uzbek-medium schools. Conversely, I define the control group as respondents who studied in and graduated from Kyrgyz/Russian-medium schools.

In my DiD setup, I let $D_i = 1$ if respondent i attended an Uzbek-medium school, and $D_i = 0$ if respondent i attended a Kyrgyz/Russian-medium school.

Furthermore, the potential outcomes are

$Y_i^{before}(0)$ = employment status of respondent i in the before-cohort without the treatment,
$Y_i^{after}(0)$ = employment status of respondent i in the after-cohort without the treatment,
$Y_i^{after}(1)$ = employment status of respondent i in the after-cohort with the treatment;

and the observed outcomes are

$Y_i^{before} = Y_i^{before}(0)$ for respondents in the control group ($D_i = 0$),
$Y_i^{before} = Y_i^{before}(0)$ for respondents in the treated group ($D_i = 1$),
$Y_i^{after} = Y_i^{after}(0)$ for respondents in the control group ($D_i = 0$),
$Y_i^{after} = Y_i^{after}(1)$ for respondents in the treated group ($D_i = 1$).

I want to estimate

$$ATET = E[Y_i^{after}(1) - Y_i^{after}(0) \mid D_i = 1] = P[Y_i^{after}(1) - Y_i^{after}(0) \mid D_i = 1] = \mathrm{P}[Y_i^{after}(1) \mid D_i = 1] - \mathrm{P}[Y_i^{after}(0) \mid D_i = 1],$$

where $P[Y_i^{after}(0) \mid D_i = 1]$ is unobserved.

Since $P[Y_i^{after}(0) \mid D_i = 1]$ is unobservable, I use the DiD estimator to approximate it:

$$ATET = [P(Y_i^{after} \mid D_i = 1) - P(Y_i^{after} \mid D_i = 0)] - [P(Y_i^{before} \mid D_i = 1) - P(Y_i^{before} \mid D_i = 0)] = \hat{\beta}_3,$$

or

$$ATET = [P(Y_i^{after} \mid D_i = 1) - P(Y_i^{before} \mid D_i = 1)] - [P(Y_i^{after} \mid D_i = 0) - P(Y_i^{before} \mid D_i = 0)] = \hat{\beta}_3.$$

That way, the DiD estimator $\hat{\beta}_3$ identifies the average treatment effect on the treated and captures the causal effect of the policy, given the parallel trends assumption holds.

5.3 Supportive Evidence for Parallel Trends

The key identification assumption for obtaining a reliable estimate of the policy impact $\hat{\beta}_3$ is the presence of parallel trends with respect to the outcome variable. That is, in the absence of the policy reform, the average change in the employment outcome in the Uzbek group would have been the same as the average change in the employment outcome in the Kyrgyz/Russian group.

Figure 1 shows that, before 2013, trends for residualized employment, *i.e.*, the employment rate conditioned on individual characteristics, between respondents from Uzbek-medium schools and respondents from Kyrgyz/Russian-medium schools are parallel, but then they begin to follow different trajectories once the policy is launched. A noticeable drop in 2014 for both groups likely reflects a broad labor market shock. This downturn in employment

coincides with the economic recession in Russia triggered by the imposition of international sanctions, which led to contraction in demand for migrant labor (IMF, 2014). A more pronounced divergence in the trends is observed after 2015. This is likely due to the fact that some students still managed to take the exam in Uzbek language in 2013 and 2014, whereas by 2015, no such cases were recorded (24.kg, 2015). Nevertheless, I also formally test if the change in the trends before the policy reform is statistically different between the treated and control groups. Table 2 presents the relevant estimates, which provide supporting evidence for the parallel trends.

With respect to the binary farm employment outcome, the pre-treatment trends for the treated and control groups are not exactly parallel. However, the scatter plot on Figure 2 reveals that before 2013, the mean residualized farm employment for the treated group lies below its counterpart for the control group and, once the policy is implemented, the treated group exhibits a substantially higher mean residualized farm employment rate compared to the control group. I also formally test if the change in the trends in the pre-treatment period is statistically different between the treated and control groups. Table 3 presents the relevant estimates, which again provide supporting evidence for the parallel trends. Taken together, this evidence supports a causal effect of the policy change on the farm employment outcome.

Finally, the formal test for the first-stage relationship indicates the presence of statistically significant difference in the change in the NUT participation pre-trends between the two groups (Table 4). Furthermore, Figure 3 shows neither parallel pre-trends nor notable patterns in the mean residualized NUT uptake rates across the treated and control groups. Nevertheless, this shortcoming does not compromise the validity of my identification strategy since establishing causality in the first stage is not a necessary condition for the DiD estimator to yield a consistent estimate of the treatment effect (Lechner, 2010).

6 Results

In this section, I present the DiD estimates. I begin by examining the effect of the NUT participation on university attendance. Then I show the impact of the Uzbek language elimination on the exam uptake. Next, I evaluate the policy effect on the employment probability. Finally, I present the results of the policy impact on the probability of farm employment to identify a sectoral source through which the effect is established. Together, these results provide a comprehensive understanding of how the 2013 policy change influenced educational and labor market outcomes in the Kyrgyz Republic.

6.1 The Role of NUT Participation in University Attendance

Since the NUT became a mandatory requirement for university admission only from 2012 onwards and my estimation sample includes respondents who may have graduated prior to 2012, I estimate model (2) using OLS to verify that the exam functions as a gatekeeping mechanism for tertiary education. These findings contextualize and explain the subsequent results.

Table 5 reports that those who had participated in the NUT attained at least a bachelor's degree. This evidence suggests that the NUT indeed serves as a filtering mechanism for access to higher education. When I account for other controls or restrict the sample, the estimated effect remains similar and statistically significant at the 1 percent level. Column (1) shows the most relaxed specification: those respondents who participated in the NUT have, on average, 12.1 percentage points higher probability of obtaining at least a bachelor's degree. This translates into 80 percent increase relative to the baseline mean.

These results highlight the role of the NUT as an institutional barrier that influences educational trajectories by determining access to tertiary education. Consequently, the NUT's influence extends to further educational attainment and thus labor market prospects.

6.2 First-Stage Relationship: The Policy Impact on the NUT Participation

Consistent with expectations and common sense, Table 6 shows that the 2013 elimination of the Uzbek language option reduces the NUT uptake. Specifically, column (2) reveals that among respondents from Kyrgyz/Russian-medium schools, those who graduated after the policy change have, on average, 13.7 percentage points higher probability of participating in the exam compared to those who graduated before the policy change, other things being equal. This translates into 135 percent increase relative to the baseline mean. The coefficient is statistically significant at the 1 percent level.

At the same time, among respondents in the before-cohort, those from Uzbek-medium schools have, on average, 17.2 percentage points lower probability of participating in the exam compared to respondents from Kyrgyz/Russian-medium schools, other things being equal. This translates into 98 percent decrease relative to the baseline mean. The coefficient is statistically significant at the 1 percent level.

Overall, the difference in the NUT participation probability between cohorts for students from Uzbek- and Kyrgyz/Russian-medium schools amounts to a negative 12.6 percentage points, which is 72 percent decrease relative to the baseline mean. The estimated coefficient is statistically significant at the 1 percent level. While the results are not significantly different from zero in all specifications, the sign and magnitude of the first-stage results remain similar across various specifications.

The first-stage results emphasize a negative relationship between the Uzbek language elimination and the exam participation. Moreover, the consistent magnitude of these results across specifications supports the robustness of these findings. This relationship signals the presence of the policy impact channel, which I examine in Section 6.3.

6.3 Reduced Form Relationship: The Policy Impact on the Employment Probability

Table 7 shows the policy impact on the employment probability. In the most relaxed specification (column (1)), among respondents who attended Kyrgyz/Russian-medium schools, those who graduated after the policy change have, on average, 12.2 percentage points lower probability of being employed at age 20-29 compared to those who graduated before the policy change. This translates into 67 percent decrease relative to the baseline mean. The coefficient is statistically significant at the 1 percent level.

The negative estimate is also observed for the respondents from Uzbek-medium schools compared to the respondents from Kyrgyz/Russian-medium schools who belong to the pre-treatment cohort. Particularly, students from Uzbek-medium schools have, on average, 15.7 percentage points lower probability of being employed compared to their counterparts in the control group. This translates into 101 percent decrease relative to the baseline mean. Again, the coefficient is statistically significant at the 1 percent level.

The most counterintuitive finding is the effect of the policy on the employment probability. Withdrawal from the NUT, following the elimination of Uzbek language from the test, results in a 21.6 percentage points higher probability of being employed, which is 119 percent increase relative to the baseline mean. The estimated coefficient is statistically significant at the 1 percent level.

Throughout all model specifications, the coefficient on $policy_i$ variable is similar in magnitude and significantly different from zero at the 1 percent level. In the most rigid specification (column (9)), where I account for individual observable characteristics, region-of-birth and school location fixed effects, and exclude year 2012, respondents born outside Kyrgyzstan, and respondents from Russian-taught schools, the magnitude of the policy effect increases even further. Particularly, non-participation in the NUT results in a 31.5 percentage

points higher probability of being employed, which is 161 percent increase relative to the baseline mean.

Notably, the reduced form results suggest that the elimination of the Uzbek language option in the NUT had counterintuitively positive and substantial effects on the employment outcome. While Uzbek-taught students were initially at a disadvantage in terms of employment probability likely due to structural or socioeconomic barriers, the policy shock appears to have inadvertently redirected their trajectories towards earlier labor market entry. Furthermore, a relative increase in the outcome is not observed among students from Kyrgyz/Russian-medium schools. This differential response is unlikely to stem from differences in test participation rates alone. It rather may reflect an institutional exclusion (supported by the results in Table 5) prompting earlier integration into the labor market. Therefore, the estimated treatment effect likely captures a structural realignment in post-secondary decision-making induced by the policy, rather than merely compositional changes in test-taking behavior.

Nevertheless, the positive policy impact is unexpected and warrants further investigation into the sectoral drivers of this effect, which I examine in Section 6.4.

6.4 Sectoral Source: The Policy Impact on the Probability of Farm Employment

Among the various employment indicators available in the questionnaire, using a binary indicator for farm employment as the outcome variable in model (1) yields statistically significant results. This outcome suggests that the observed positive effect in the reduced form relationship may be driven, at least in part, by corresponding shifts in sectoral employment. Table 4 reports that a withdrawal from the NUT leads to a higher probability of being employed in the agricultural sector. Specifically, column (1) shows that non-participation in the NUT leads to, on average, 20.8 percentage points higher likelihood of engaging in agricultural employment within the next few years upon completion of high school. This translates into 424

percent increase relative to the baseline mean. The coefficient is statistically significant at the 1 percent level and robust across all specifications.

The estimated coefficient on the $after_i$ variable is positive but not significantly different from zero in all specifications, suggesting that there was no significant change in the outcome between cohorts among respondents from Kyrgyz/Russian-medium schools. A similar pattern is observed for changes in farm employment likelihood between respondents from Uzbek- and Kyrgyz/Russian-medium schools in the pre-treatment cohorts: the estimated coefficient on the $uzbek_i$ variable is not robust to the inclusion of additional controls or sample restrictions.

In a context where rural livelihoods and agriculture remain viable employment alternatives, especially for those with limited educational qualifications, the increase in employment observed in the reduced form estimates following the policy change is most likely driven by a shift towards agricultural work among early labor market entrants. The relevance of this interpretation is supported by the fact that the majority of Uzbek-medium schools are situated in rural southern regions, where agriculture represents a significant source of employment. Moreover, rural areas in the south of the country stagnate more than rural areas in the north, hence fewer employment opportunities for the youth in the south (Tilekeyev et al., 2019). Furthermore, the lack of a significant change between cohorts for students from Kyrgyz/Russian-medium schools further supports the notion that the observed shift is driven by differential exposure to the reform rather than broader labor market trends. Similarly, the absence of a significant change in farm employment between respondents from Uzbek- and Kyrgyz/Russian-medium schools in the pre-treatment cohorts suggests that the post-reform divergence is not due to pre-existing differences in sectoral employment patterns.

Overall, I find that the 2013 policy change has led to an increased employment probability. Taken together, my findings suggest that one plausible explanation of this positive effect is that students who are no longer able to sit the NUT in their preferred language face

higher barriers in accessing university education. In turn, this leads them to enter the labor market directly after high school. Given the limited opportunities for unskilled youth, agriculture may have become a default option, particularly in rural areas where there is higher demand for unskilled labor. These findings have important policy implications, which I discuss in the sections that follow.

7 Conclusion

My research investigates whether participation in the NUT, a school-exit standardized exam, affects high school graduates' employment status in the years following graduation. I exploit the 2013 policy reform, which eliminated the possibility to take the test in Uzbek language. This policy change particularly affected students from Uzbek-medium schools, which are primarily located in southern rural areas of Kyrgyzstan near the Uzbekistan border. To assess the policy impact, I use a DiD strategy, where I assign students from Uzbek-medium schools to the treated group and students from Kyrgyz/Russian-medium schools to the control group. Variation in the treatment is based on the cohort dummy, *i.e.*, whether a respondent graduated before or after 2013.

The ultimate effect of school graduation exams on the employment status in the existing literature is inconclusive. Most of the literature reports positive or insignificant effects on employment outcomes (Dee and Jacob, 2006; Holme et al., 2010; Baker and Lang, 2013). In contrast, I show that the withdrawal from the exam leads increased employment, which challenges existing findings.

Specifically, I find that withdrawal from the exam leads to a 21.6 percentage points increase in the probability of being employed. Moreover, most of this positive effect is driven by farm employment, which increases by 20.8 percentage points following the policy change. These results are robust and statistically significant at the 1 percent level across all model specifications. The employment increase in agriculture is explained by the scarcity of alternative opportunities in the southern rural regions (Tilekeyev et al., 2019).

I also empirically prove that, for my estimated sample, the NUT serves as a gatekeeping mechanism towards tertiary education, despite it becoming such a requirement only in 2012. This evidence explains the observed positive estimates of the policy impact. Students that were excluded from the exam participation were more likely to enter the labor market directly after

high school. Given that my setting implies that those students are mostly respondents from rural areas, agricultural work may have emerged as the predominant fallback in the absence of other opportunities for unskilled youth.

My research contributes to the existing literature by focusing on the case of Kyrgyzstan and a broader context of emerging economies, which are largely overlooked in the related literature. To date, there are no prior studies that examine the relationship between exam participation and employment outcomes in the country, let alone explore the causal links.

The novelty of my research is based on the new empirical approach that I adopt. While previous works utilize TWFE models (Dee and Jacob, 2006; Holme et al., 2010; Baker and Lang, 2013), I use a DiD strategy, which is especially relevant when studying policy effects. Furthermore, I use the comprehensive LiK dataset, which has not been previously used to assess the relationship between educational attainment and labor market outcomes.

My analysis serves as a starting point in the field of causal evidence of school-exit exams and their labor market effects in the contexts of Kyrgyzstan and emerging countries in general, and it lays the groundwork for future research in this area. In particular, it would be interesting to explore how participation in such examinations affects earnings and broader measures of labor market performance.

8 Policy Recommendations

The school-to-work transition is an uncertain and often stressful period for high school graduates. Supporting them in the transition from high school to post-secondary pathways might help improve graduates' long-term employment outcomes. My empirical estimates imply the following policy recommendations.

Invest in agricultural vocational schools. My results suggest that non-participation in the NUT leads to increased employment in the farming sector (Table 8). Therefore, one direction of policy intervention is improving the quality of education for those who go to agricultural vocational schools. Potential quality improvements may include equipping the schools with modern machinery and digital tools. Incorporating agri-business and agri-entrepreneurship tracks could advance students' skillsets and increase the sector's appeal among applicants.

Provide transport support. Given that agricultural work is performed in rural regions where personal vehicles are scarce compared to the capital city (National Statistical Committee of the Kyrgyz Republic, 2024), providing transport subsidies or public transport tickets may help students overcome logistical barriers and consistently attend agricultural vocational schools.

Resume NUT in Uzbek language. My findings also suggest that participation in the NUT leads to increased university enrollment (Table 5). Therefore, another angle of policy intervention is to focus on the principle of equality of opportunity. While Uzbek language does not hold an official status in the country, Uzbeks compose a significant minority of the population. Eliminating the language barrier could be an effective way to improve access to higher education and broader employment opportunities for this group.

Integrate career advice programs in high school. My findings imply that the exam functions as a gatekeeping mechanism towards tertiary education and thus broader employment

prospects. Decision to withdraw from the NUT and subsequent early entry into the labor market may as well reflect recent school graduates' limited exposure to career planning resources. Organizing workshops and workplace visits as part of extracurricular activities could expose students to employment options and employers' expectations. This policy intervention is likely to mitigate potential information frictions and help high school graduates make informed decisions about post-secondary choices.

Pilot parallel university entrance system. Piloting a university admission system that is based on continuous academic achievements alongside or instead of the NUT might provide university admission commissions a more comprehensive and holistic view of each candidate's profile and lessen the all-or-nothing nature of the NUT.

To fully understand if information frictions or inefficiencies in the NUT as a gatekeeping mechanism are present and hinder employment outcomes for recent high school graduates, more information and data are needed. Addressing these gaps as well as exploiting datasets that contain information on broader labor market performance indicators offers a promising avenue for extending this research.

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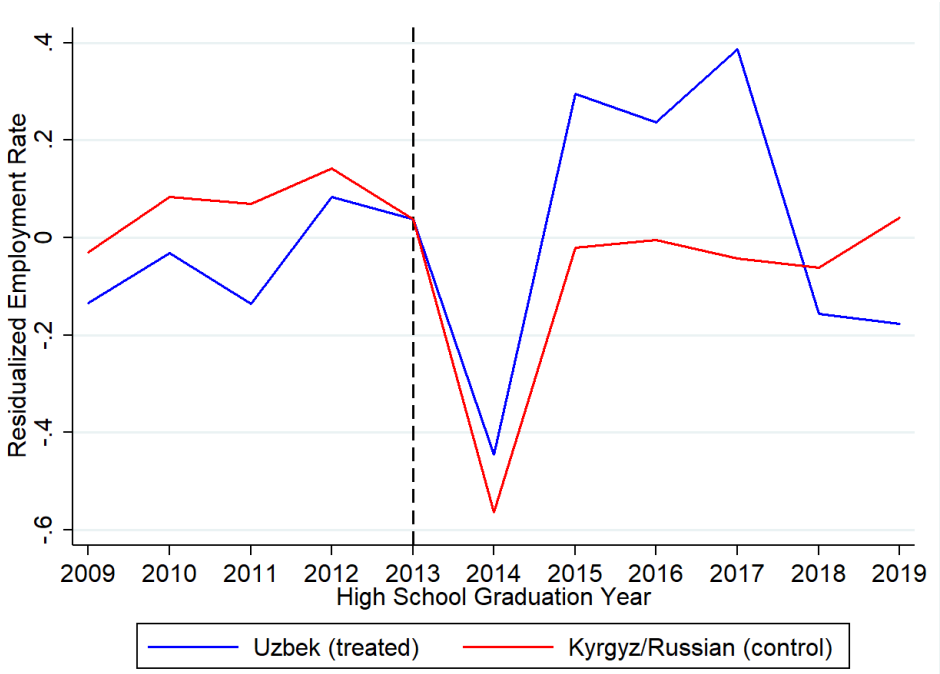
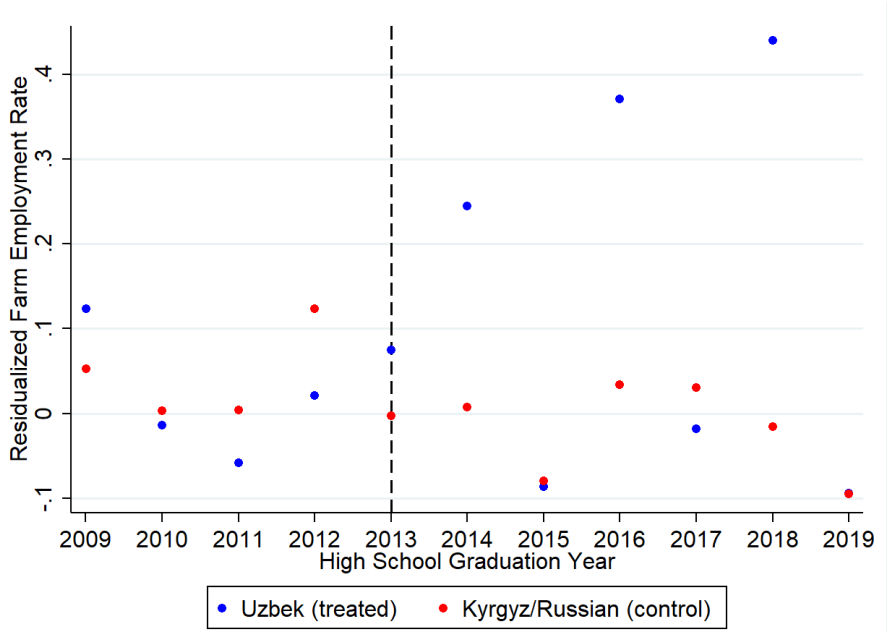
Appendix

FIGURE 1 – Trends in Employment Rate for Students from Uzbek- and Kyrgyz/Russian-medium Schools



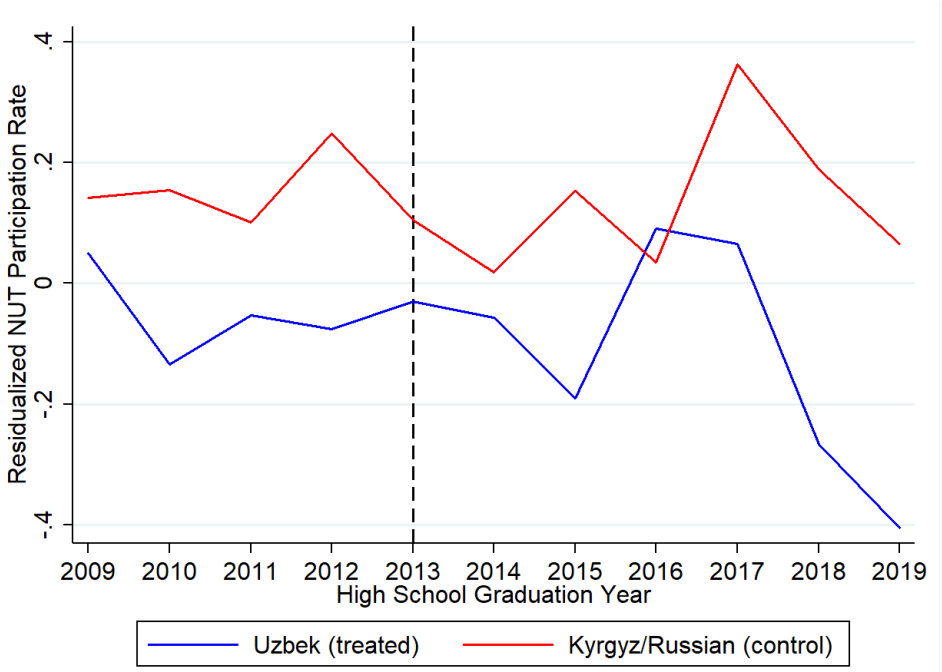
Notes: Figure 1 shows trends in mean employment rates for respondents from Uzbek- and Kyrgyz/Russian/medium schools. The policy change occurred in 2013. Data: LiK (2010-2013, 2016, 2019).

FIGURE 2 – Employment Rates by Cohort for Students from Uzbek- and Kyrgyz/Russian-medium Schools



Notes: Figure 2 shows mean employment rates for respondents from Uzbek- and Kyrgyz/Russian/medium schools. The policy change occurred in 2013. Data: LiK (2010-2013, 2016, 2019).

FIGURE 3 – Trends in NUT Participation Rate for Students from Uzbek- and Kyrgyz/Russian-medium Schools



Notes: Figure 3 shows trends in mean NUT participation rates for respondents from Uzbek- and Kyrgyz/Russian/medium schools. The policy change occurred in 2013. Data: LiK (2010-2013, 2016, 2019).

TABLE 1 – Descriptive Statistics

Panel A: **Treated Group**

Variable	Obs	Mean	Std. Dev.
employment	349	.413	4.13
farm employment	348	.075	.263
nut	451	.193	.395
university	451	.047	.211
male	407	.491	.501
married	407	.779	.416
Ethnicity			
Kyrgyz	407	.025	.155
Uzbek	407	.865	.342
Russian	407	0	0
other	407	.111	.314
School Location			
Bishkek	402	.002	.05
other city	402	.209	.407
village	402	.376	.485
other	402	.413	.493
Birth Place			
Issyk-Kul	370	.008	.09
Jalal-Abad	370	.17	.376
Naryn	370	.003	.052
Batken	370	.03	.17
Osh	370	.519	.5
Talas	370	0	0
Chui	370	.005	.073
Bishkek	370	.003	.052
Osh city	370	.232	.423
outside Kyrgyzstan	370	.03	.17

Panel B: **Control Group**

Variable	Obs	Mean	Std. Dev.
employment	1890	.351	.478
farm employment	1890	.086	.281
nut	2620	.417	.493
university	2620	.169	.375
male	2246	.503	.5
married	2242	.585	.493
Ethnicity			
Kyrgyz	2246	.809	.394
Uzbek	2246	.04	.196
Russian	2246	.06	.238
other	2246	.091	.288
School Location			
Bishkek	2372	.122	.327
other city	2372	.147	.354
village	2372	.304	.46
other	2372	.426	.495
Birth Place			
Issyk-Kul	2309	.114	.318
Jalal-Abad	2309	.165	.372
Naryn	2309	.071	.256
Batken	2309	.085	.279
Osh	2309	.207	.406
Talas	2309	.046	.209
Chui	2309	.155	.362
Bishkek	2309	.107	.309
Osh city	2309	.018	.134
outside Kyrgyzstan	2309	.032	.175

Notes: Table 1 shows descriptive statistics for treated group (*Panel A*) and control group (*Panel B*). Data: LiK (2010-2013, 2016, 2019).

TABLE 2 – Formal Test for Parallel Trends, Reduced Form Relationship

VARIABLES	PTA Formal Test
cohort	0.002
	(0.0033)
uzbek	1.691
	(18.7830)
cohort × uzbek	**-0.001**
	(0.0094)
Observations	1575
R-squared	0.012

Notes: Table 2 shows results for the model $employment\_residualized_g = \beta_0 + \beta_1 cohort + \beta_2 uzbek + \beta_3 (cohort \times uzbek) + \eta$. Only pre-policy cohorts are included. Robust standard errors are in parentheses and clustered at high-school graduation year level. *** p<0.01, ** p<0.05, * p<0.1. The tested hypothesis is H_0: $\beta_3 = 0$; H_1: $\beta_3 \neq 0$. I fail to reject H_0 and confirm that the change in trends before the policy reform is not statistically different between treated and control groups. Data: LiK (2010-2013, 2016, 2019).

TABLE 3 – Formal Test for Parallel Trends, Farm Employment Outcome

VARIABLES	PTA Formal Test
cohort	0.004***
	(0.0014)
uzbek	-4.790
	(6.1213)
cohort × uzbek	**0.002**
	(0.0031)
Observations	1575
R-squared	0.008

Notes: Table 3 shows results for the model $farm\_employment\_residualized = \beta_0 + \beta_1 cohort + \beta_2 uzbek + \beta_3 (cohort \times uzbek) + \xi$. Only pre-policy cohorts are included. Robust standard errors are in parentheses and clustered at high-school graduation year level. *** p<0.01, ** p<0.05, * p<0.1. The tested hypothesis is H_0: $\beta_3 = 0$; H_1: $\beta_3 \neq 0$. I fail to reject H_0 and confirm that the change in trends before the policy reform is not statistically different between treated and control groups. Data: LiK (2010-2013, 2016, 2019).

TABLE 4 – Formal Test for Parallel Trends, First-Stage Relationship

VARIABLES	PTA Formal Test
cohort	0.016***
	(0.0040)
uzbek	28.804***
	(10.0846)
cohort × uzbek	**-0.0144*** **
	(0.0050)
Observations	1806
R-squared	0.041

Notes: Table 4 shows results for the model $nut\_residualized_g = \beta_0 + \beta_1 cohort + \beta_2 uzbek + \beta_3(cohort \times uzbek) + u$. Only pre-policy cohorts are included. Robust standard errors are in parentheses and clustered at high-school graduation year level. *** p<0.01, ** p<0.05, * p<0.1. The tested hypothesis is H_0: $\beta_3 = 0$; H_1: $\beta_3 \neq 0$. I reject H_0 and confirm that the change in trends before the policy reform is statistically different between treated and control groups. Data: LiK (2010-2013, 2016, 2019).

TABLE 5 – OLS Estimates of the Effect of NUT Participation on University Enrollment

	DEPENDENT VARIABLE – 1: holds at least bachelor's degree									
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
nut	0.121***	0.119***	0.0809***	0.0863***	0.0986***	0.114***	0.0981***	0.0907***	0.105***	0.0997***
	(0.0252)	(0.0311)	(0.0269)	(0.0318)	(0.0256)	(0.0250)	(0.0265)	(0.0265)	(0.0259)	(0.0261)
mean *university*	0.151	0.165	0.148	0.162	0.175	0.159	0.178	0.177	0.162	0.175
School location		yes		yes	yes	yes	yes	yes	yes	yes
Birth place			yes	yes	yes	yes	yes	yes	yes	
Individual level characteristics					yes	yes	yes	yes	yes	yes
Excl. Russian						yes			yes	
Excl. born outside KGZ							yes		yes	
Excl. 2012								yes	yes	
Uzbek-concentrated regions										yes
Observations	4,443	3,252	3,388	2,586	2,169	1,705	2,111	2,055	1,585	2,169
R-squared	0.027	0.063	0.033	0.060	0.117	0.107	0.115	0.113	0.099	0.113

Notes: Table 5 shows the relationship between NUT uptake and university degree attainment for individuals aged 20-29 years old. Only the latest available observation per respondent is included. Dependent variable is a binary variable indicating whether individuals aged 20-29 years old were ever enrolled in a university. Mean of the dependent variable is calculated for all individuals in the regression sample. Robust standard errors are in parentheses and clustered at high-school graduation year level. *** p<0.01, ** p<0.05, * p<0.1. Data: LiK (2010-2013, 2016, 2019).

TABLE 6 – Difference-in-Differences Estimates of the Effect of Uzbek Language Elimination on NUT Uptake

	DEPENDENT VARIABLE – 1: participated in NUT									
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
after	0.199***	0.237***	0.219***	0.248***	0.106*	0.146**	0.0999*	0.111*	0.141**	0.103*
	(0.0497)	(0.0461)	(0.0496)	(0.0460)	(0.0552)	(0.0593)	(0.0548)	(0.0553)	(0.0572)	(0.0521)
uzbek	-0.221***	-0.172***	-0.206***	-0.182***	-0.198***	-0.177**	-0.207***	-0.170***	-0.177**	-0.203***
	(0.0322)	(0.0309)	(0.0437)	(0.0422)	(0.0617)	(0.0803)	(0.0553)	(0.0603)	(0.0853)	(0.0616)
policy	**-0.0691**	**-0.126*** **	**-0.0602**	**-0.133** **	**-0.130***	**-0.136***	**-0.101**	**-0.149** **	**-0.120**	**-0.131***
	(0.0463)	**(0.0435)**	**(0.0502)**	**(0.0573)**	**(0.0690)**	**(0.0791)**	**(0.0694)**	**(0.0698)**	**(0.0840)**	**(0.0693)**
mean *nut*	0.170	0.176	0.150	0.153	0.143	0.143	0.142	0.149	0.148	0.143
School location		yes		yes	yes	yes	yes	yes	yes	yes
Birth place			yes	yes	yes	yes	yes	yes	yes	
Individual level characteristics					yes	yes	yes	yes	yes	yes
Excl. Russian						yes			yes	
Excl. born outside KGZ							yes		yes	
Excl. 2012								yes	yes	
Uzbek-concentrated regions										yes
Observations	2,760	2,516	2,367	2,209	1,860	1,396	1,805	1,755	1,288	1,860
R-squared	0.045	0.069	0.076	0.095	0.162	0.165	0.162	0.164	0.169	0.161

Notes: Table 6 shows results for the first-stage relationship for individuals aged 20-29 years old. Only the latest available observation per respondent is included. Dependent variable is a binary variable indicating participation in the NUT for individuals aged 20-29 years old. Mean of the dependent variable is calculated for treated individuals in the pre-policy period. *after* equals 1 if high school graduation year is 2013 or later; *uzbek* equals 1 if the student's school language is Uzbek. Robust standard errors are in parentheses and clustered at high-school graduation year level. *** p<0.01, ** p<0.05, * p<0.1. Data: LiK (2010-2013, 2016, 2019).

TABLE 7 – Difference-in-Differences Estimates of the Effect of Uzbek Language Elimination on Employment Probability

	DEPENDENT VARIABLE – 1: employed at age 20-29									
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
after	-0.122***	-0.164***	-0.0982**	-0.155***	-0.109*	-0.131**	-0.112*	-0.105*	-0.128**	-0.108*
	(0.0327)	(0.0263)	(0.0386)	(0.0329)	(0.0598)	(0.0619)	(0.0605)	(0.0573)	(0.0617)	(0.0599)
uzbek	-0.183***	-0.157***	-0.130***	-0.117***	0.0462	-0.00806	0.0373	0.0282	-0.0381	0.0264
	(0.0293)	(0.0294)	(0.0396)	(0.0429)	(0.0655)	(0.0645)	(0.0698)	(0.0661)	(0.0623)	(0.0640)
policy	**0.216*** **	**0.273*** **	**0.235*** **	**0.256*** **	**0.273*** **	**0.263*** **	**0.317*** **	**0.278*** **	**0.315*** **	**0.267*** **
	(0.0643)	**(0.0503)**	**(0.0698)**	**(0.0732)**	**(0.0766)**	**(0.0821)**	**(0.0924)**	**(0.0791)**	**(0.0987)**	**(0.0711)**
mean *employment*	0.182	0.177	0.195	0.199	0.204	0.204	0.199	0.201	0.196	0.204
School location		yes		yes	yes	yes	yes	yes	yes	yes
Birth place			yes	yes	yes	yes	yes	yes	yes	
Individual level characteristics					yes	yes	yes	yes	yes	yes
Excl. Russian						yes			yes	
Excl. born outside KGZ							yes		yes	
Excl. 2012								yes	yes	
Uzbek-concentrated regions										yes
Observations	1,992	1,861	1,734	1,652	1,622	1,194	1,573	1,546	1,115	1,622
R-squared	0.021	0.091	0.061	0.097	0.144	0.099	0.143	0.143	0.099	0.137

Notes: Table 7 shows results of estimating the Difference-in-Differences model for individuals aged 20-29 years old. Only the latest available observation per respondent is included. Dependent variable is a binary variable indicating employment status for individuals aged 20-29 years old. Mean of the dependent variable is calculated for treated individuals in the pre-policy period. *after* equals 1 if high school graduation year is 2013 or later; *uzbek* equals 1 if the student's school language is Uzbek. Robust standard errors are in parentheses and clustered at high-school graduation year level. *** p<0.01, ** p<0.05, * p<0.1. Data: LiK (2010-2013, 2016, 2019).

TABLE 8 – Difference-in-Differences Estimates of the Effect of Uzbek Language Elimination on the Probability of Farm Employment

	DEPENDENT VARIABLE – 1: employed in agriculture at age 20-29									
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
after	0.0197	0.0199	0.0161	0.0126	0.0467	0.0381	0.0466	0.0502	0.0448	0.0517
	(0.0279)	(0.0291)	(0.0242)	(0.0221)	(0.0394)	(0.0490)	(0.0390)	(0.0366)	(0.0434)	(0.0392)
uzbek	-0.0377**	-0.0365**	-0.00939	-0.00115	-0.0120	-0.0264	-0.00668	0.00267	0.0102	0.00599
	(0.0145)	(0.0163)	(0.0203)	(0.0202)	(0.0307)	(0.0531)	(0.0331)	(0.0290)	(0.0538)	(0.0267)
policy	**0.208*** **	**0.196*** **	**0.181*** **	**0.198*** **	**0.181** **	**0.191** **	**0.206*** **	**0.174** **	**0.202*** **	**0.173** **
	(0.0465)	**(0.0529)**	**(0.0473)**	**(0.0632)**	**(0.0759)**	**(0.0756)**	**(0.0734)**	**(0.0752)**	**(0.0742)**	**(0.0781)**
mean *farm employment*	0.049	0.051	0.051	0.052	0.053	0.053	0.055	0.057	0.058	0.053
School location		yes		yes	yes	yes	yes	yes	yes	yes
Birth place			yes	yes	yes	yes	yes	yes	yes	
Individual level characteristics					yes	yes	yes	yes	yes	yes
Excl. Russian						yes			yes	
Excl. born outside KGZ							yes			
Excl. 2012								yes	yes	
Uzbek-concentrated regions										yes
Observations	1,992	1,861	1,734	1,652	1,622	1,194	1,573	1,546	1,115	1,622
R-squared	0.013	0.049	0.052	0.076	0.096	0.104	0.099	0.095	0.102	0.075

Notes: Table 8 shows results of estimating the Difference-in-Differences model for individuals aged 20-29 years old. Only the latest available observation per respondent is included. Dependent variable is a binary variable indicating whether individuals aged 20-29 years old are employed on a farm. Mean of the dependent variable is calculated for treated individuals in the pre-policy period. *after* equals 1 if high school graduation year is 2013 or later; *uzbek* equals 1 if the student's school language is Uzbek. Robust standard errors are in parentheses and clustered at high-school graduation year level. *** p<0.01, ** p<0.05, * p<0.1. Data: LiK (2010-2013, 2016, 2019).