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Do tuition fees affect enrollment behavior? Evidence from a 'natural experiment' in Germany

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ABSTRACT

This paper uses the introduction of tuition fees in seven of the sixteen German states in 2007 as a natural experiment to identify the effects of tuition prices on enrollment probabilities. Based on information on enrollment decisions of the entire population of high-school graduates between 2002 and 2008, I find a negative effect of tuition fees on enrollment behavior. The effect is larger than in existing studies for European countries, but of a similar magnitude as effects identified with U.S. data. A potential spill-over effect of the policy intervention to the comparison group is accounted for by using the estimation results to calibrate a structural model of the enrollment decision.

1. Introduction

Since the 1990s the share of private contributions to the funding of higher education has increased in many OECD countries. Often, rising private contributions were associated with the introduction of tuition fees (e.g. Australia in 1989, Great Britain in 1998 and Germany in 2007). At the same time, a steadily rising college wage premium has made facilitating access to college a frequently stated policy objective. Quantifying the effect of tuition fees on enrollment is therefore important to enable more informed policy making.

There is a long literature that examines the effect of college cost on enrollment into higher education (see Leslie and Brinkman (1987) for an extensive survey of these studies prior to 1988). These early studies have either tried to exploit cross-state or cross-time variations in tuition fees to estimate their impact on enrollment rates. In this approach, it is however difficult to control for all possible confounding factors. Estimates based on cross-sectional variations might for instance be biased if there are unobservable differences in preferences for higher education across states. In this case, the observation of low tuition fees and high university enrollment does not necessary reflect a causal relationship, as pointed out by Dynarski (2000).

Therefore, a small but growing literature now makes use of quasi-experiments to identify the causal effect of college costs on enrollment into higher education These studies tend to suggest that the costs of higher education affect enrollment decisions. Deming and Dynarski (2009) report that in general, eligibility of $1000 of student aid increases college attendance rates by four percentage points. However, the studies surveyed by Deming and Dynarski (2009) focus on the impact of *student aid* on enrollment decisions and the effects critically depend on the form of the intervention taken. Less targeted programs tend to have larger effects. This suggest that tuition fees, which affect college

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costs in a different way than student aid, might have a substantially different impact on enrollment rates.

This paper extends the aforementioned literature by applying the quasi-experimental design to identify the effect of *tuition fees* on enrollment rates. It uses a two year episode in which seven of the sixteen German states levied tuition fees as a natural experiment to identify the effect of tuition fees on enrollment rates. Based on individual enrollment decisions of the full population of German high-school graduates, I measure the effect of tuition fees by comparing the trend of enrollment rates amongst high-school graduates in the states that introduced tuition fees (henceforth 'fee states') relative to enrollment rates of high-school graduates in the states in which access to university remained free of charge ('non-fee states').

From a methodological point of view, a central challenge of this paper consists in addressing the problem of a contaminated comparison group. Because high-school graduates are at least imperfectly mobile between states, the policy intervention might also affect the enrollment decision of high-school graduates in the non-fee states. The difference-in-differences approach then underestimates the true impact of the policy intervention. To account for this spill-over effect, I relate the results from the difference-in-differences estimation to the parameters of a simple structural model of the enrollment decision, allowing me to approximate the true average treatment effect on the treated.

My results suggest that the introduction of tuition fees at a level of roughly 1000€ annually had a negative impact on enrollment rates that is both economically and statistically significant. The estimated average treatment effect on the treated indicates that tuition fees reduced enrollment rates amongst high-school graduates in the fee states by 2.7 percentage points. Using the structural model to correct for the spill-over to the comparison group suggests that the true effect has reduced enrollment probabilities by approximately 4.7 percentage points. The size of this effect is in the range of the results surveyed in Deming and Dynarski (2009).

Apart from applying a quasi-experimental identification strategy to the impact of tuition fees on enrollment rates, a further contribution of this paper is to identify the effect of tuition fees in a new institutional setup. Existing studies of the impact of college costs on enrollment typically draw on data from the United States, where tuition fees have a longer history than in Europe. The effect is however likely to be highly country specific as the enrollment decision depends on institutional details, such as the availability of student aid and the specifics of a country's tax-code (see Jacobs (2008) on the relationship between taxes and human capital). For instance, and in contrast to most studies using U.S. data, the few studies trying to quantify the effect on tuition fees on enrollment rates using European data have in general found only a very small or insignificant effect (Canton & de Jong, 2005; Fredriksson, 1997; Huijsman, Kloek, Kodde, & Ritzen, 1986).

For Germany, where tuition fees did not exist until very recently, evidence on the relationship between college costs and enrollment behavior comes from evaluations of the federal student aid system BAföG. However, these studies have either found none (Baumgartner & Steiner, 2005, 2006), or only a very modest (Steiner & Wrohlich, 2008) effect on enrollment rates. In contrast to tuition fees, student aid in Germany is highly targeted. The discrepancy in results between the present paper and the studies evaluating the effects of BAföG are therefore consistent with the conclusion reached by Deming and Dynarski (2009) that less targeted programs tend to have larger effects on enrollment rates. Other research on the determinants of enrollment in Germany comes from Spiess and Wrohlich (2010). However, the authors do not consider the impact of tuition fees. Dwenger, Storck, and Wrohlich (2011) analyze the impact of tuition fees on the mobility of medical students in Germany.

There is a further noteworthy difference between the present paper and some of the related studies. By looking at the effects immediately after the introduction of tuition fees, the present study identifies a short-run effect of tuition fees. This makes it possible to separate price effects of higher tuition from quality effects. If tuition fees are used to improve the quality of a university then failure to control for the quality of an institution might lead to an underestimation of the price effect. However, because the quality of a university is relatively fixed in the short run, this issue is less in the present study.

The remainder of the paper is organized as follows: The next section provides some necessary background information about the German higher-education system and the history of tuition fees in Germany. Section 3 presents the data and introduces the estimation strategy. Results are presented in Section 4. Section 5 discusses the robustness of the results and Section 6 concludes.

2. Institutional background

In Germany, tuition fees were legally banned by federal legislation since the implementation of the federal university law (*Hochschulrahmengesetz*) in 1976. In 2005, the German constitutional court ruled that this law interferes with the rights of the German states (*Länder*) to determine their higher education policies autonomously. While the court explicitly stated that a ban of tuition fees is not in conflict with the constitution in general, it required that legislation concerning tuition fees has to be passed by state parliaments.

Soon after this decision had been made, some German states with a conservative government, Lower Saxony, Hamburg, Hesse, Baden-Württemberg, Bavaria, Saarland and North Rhine-Westphalia, passed a law which introduced tuition fees at state universities. Higher-education in the other states, Saxony-Anhalt, Rhineland-Palatine, Schleswig-Holstein, Brandenburg, Thuringa, Sachsen Saxony, Mecklenburg-Western Pomerania, Berlin and Bremen, remained free of charge. In these states, the social democratic party, which strongly opposed the fees, was a member of the governing coalition.

The first high-school graduates whose enrollment decision was influenced by tuition fees were those who were