LPEM-FEBUI Working Paper - 032
February 2019

ISSN 2356-4008

A COMPARISON BETWEEN MERIT-BASED AND TEST-BASED HIGHER EDUCATION ADMISSION IN INDONESIA

Mohamad Ikhsan
Natanael Waraney Gerald Massie
Ari Kuncoro

LPEM-FEB UI Working Paper 032

Chief Editor : Riatu M. Qibthiyyah
Editors : Kiki Verico
Setting : Rini Budiastuti

Institute for Economic and Social Research
Faculty of Economics and Business
Universitas Indonesia (LPEM-FEB UI)

Salemba Raya 4, Salemba UI Campus Jakarta, Indonesia 10430
Phone : +62-21-3143177
Fax : +62-21-31934310
Email : lpem@lpem-feui.org
Web : www.lpem.org

LPEM-FEB UI Working Paper 032, February 2019
ISSN 2356-4008

A Comparison Between Merit-Based and Test-Based Higher Education Admission in Indonesia

Mohamad Ikhsan[1,★], Natanael Waraney Gerald Massie[1,*], & Ari Kuncoro[1]

Abstract
The undergraduate admissions in Indonesia's public universities are interestingly conducted in a two-fold system. Students are first considered for the merit-based '*Undangan*' admissions, whereas the test-based admissions are conducted afterwards. This study aims to discuss the differences of academic performances of students entering universities through the merit-based and test-based admissions. Our discussion utilizes a comprehensive data of 5,470 freshmen admitted during the period 2001 to 2017 at the Faculty of Economics and Business of Universitas Indonesia. We observed the differences using regression and matching estimates controlling the students' characteristics and demographics. The findings suggest that students admitted through the *Undangan* system perform generally better. However, such difference of academic performance diminishes across time. Furthermore, we describe the potential problems and, at the same time, progress for the country's education system posed by the phenomenon.

JEL Classification: H52; I21; I23

Keywords
Academic performance — merit-based admission — test-based admission — matching methods — higher education — Indonesia

[1] *Department of Economics, Faculty of Economics and Business, Universitas Indonesia*
★**Corresponding author**: Department of Economics, Faculty of Economics and Business, Universitas Indonesia, Kampus Baru UI, Depok, Jawa Barat 16242, Indonesia. Email: mohamad.ikhsan@ui.ac.id.
*Email: natanaelmassie2009@gmail.com.

1. Introduction

The impacts of education, along with the more specific higher education, on an economy have been well documented (Avis, 2002; Harris et al., 2004; London, 2006). Furthermore, the debate on the ideal higher education, if not the general education, admission system has been ongoing extensively (Zwick, 2004; Julian, 2005). Across the globe, different systems are implemented in different regions. Higher education institutions in Asia, such as the ones in Japan, South Korea, and Southeast Asia, generally consider test-based admission as a preferred proximate. Meanwhile, similar counterparts in multiple regions of Europe and North America relies more on a screening process based admissions[1].

This study aims to contribute to the ongoing literature discussing such notion. More specifically, this study takes a closer look to Indonesia's public higher education admission, due to the distinction the system provides. Indonesian post-secondary education institutions utilizes an admission system that incorporates both merit-based and test-based screening processes, but done separately. Such separation allows for an intriguing two-stages admission censoring process; with some better details and potential problems being discussed in latter parts of this study.

In general, public universities in Indonesia admit prospective students using three separate processes. By their sequence, first there is a special admission given to select few students who excels in the National Science Olympiad (*Olimpiade Sains Nasional*). The second admission is the merit-based screening process, normally referred as *Undangan* (or, formally as *Seleksi Nasional Masuk Perguruan Tinggi Negeri*/SNMPTN). The third admission process that is done in the latter time period is the test-based admission process. Nationally, there is the *Seleksi Bersama Masuk Perguruan Tinggi Negeri* (SBMPTN) that allows the prospective students to take tests in order to enter any public university of their choice. There are also test-based admission processes done by every single public universities, such as SIMAK by Universitas Indonesia. The scope of this study revolves on the comparisons of the latter two[2].

Between the three admission systems, however, only two possess relatively more rigid standardizations; the olympiad-based and the test-based ones. The winners of the Olympiads are admitted having gone through a nationally

[1] European and American higher education institutions admit prospective students using a screening process. This does not negate the fact that SAT and/or ACT scores are also required. However, the circumstances in which the tests are used in the admission process is different from the ones in countries such as Japan and South Korea. The Asian countries use admission tests, while the former use the standardized test sores as consideration in the screening process.

[2] This study argues that comparison between the two would be sufficient, and the omission of the Olympiad-based admission will not cause any loss of generality. Instead, this study acknowledges that the questions and standard used for National Science Olympiad are already way above the high-school level. In fact, questions used are generally on par with the first-year and second-year of university materials, implicitly implying the quality of students excelling in the competition and thus given the admission to public universities are already standardized.

Table 1. Admission ratio by methods since SNMPTN and SBMPTN split in 2013

	2013	2014	2015	2016	2017	2018
SNMPTN Undangan (merit-based admission)	50%	50%	50%	40%	30%	30%
SBMPTN (nation-wide test-based admission)	30%	30%	30%	30%	30%	30%
University level test-based admissions	20%	20%	20%	30%	40%	40%
Olympiad-based admissions			Select few			

Source: Compiled by the authors

standardized university-level competitions, while the test-based admittees similarly undergo a nationally standardized university-level admissions test. However, the merit-based (or the *Undangan*) admittees' acceptances rely heavily on the screening process of their high-school scores performances, among other criteria.

The *Undangan* system was formally introduced nationally under the existing SNMPTN (then a test-based admission) system in 2011, despite being present in the previous admissions. In 2013, the admission system was finally split into the current system, i.e. SNMPTN for merit-based admissions and SBMPTN for test-based admissions. Discussions remain rife regarding the effectiveness and necessity of such admission method, as issues such as inequality and academic performances of the method remains yet to be addressed.

Interestingly, the ratio of admitted students across the admission methods has been facing numerous alterations across the years. Initially, the merit-based SNPMTN admission accounts for at least 50 percent of all admitted students during the period 2013–2015. Meanwhile, the test-based SBMPTN and university selections[3] accounts for 30 percent and 20 percent of all admissions, respectively. In 2016, the SNMPTN threshold was lowered to 40 percent. It was further decreased in 2017 into 30 percent. A more comprehensive look on the changes across the years are available in the following Table 1.

Observing such gradual decrease on the merit-based SNMPTN admissions, one may question the motives behind the government's eagerness in pushing for the test-based admissions. This study attempts to provide additional insights for this matter. Our results contribute not only to the classic question of whether the merit-based or test-based students are better, but also whether the government's agenda is justified under rigorous evaluation.

The importance of this evaluation could not be understated. After all, higher education acts as one of the final contributors in the development of human capital of a nation. Moreover, in Indonesia, the level of higher education participation is still relatively low compared to those of the elementary and secondary education. Figure 1 shows the comparison. While it could be noted that while gross enrollment rate for the elementary and secondary education are relatively high, the same could not be said of the post-secondary counterparts. If anything, the stakes for the universities to admit the objectively best candidates could not be higher under such low participation.

Furthermore, the feasibility of this evaluation could only be helped by the country's public universities' decision to use online-based academic grading and information system. For instance, Universitas Indonesia, one of the country's public universities, uses a system called SIAK NG (or *Sistem Informasi Akademik Next Generation*) as its online academic information system. Such system allows for the availability of a vast richness of individual-level data of the university students' academic performance, along with information on their admission process and demographics.

Despite its importance, however, there is little to none literature covering such topic in the country. While this could be attributed to the country's lack of academic publications on such discussions and the *Undangan* system's recent reenactment in 2011, this study argues that the earlier expositions has reiterated the need for such investigation. This reasoning gives the grounds for the study to be conducted, with the hopes that better inferences and implications could be observed by future policymakers and practitioners alike.

This study's aim is generally to investigate the effectiveness of the merit-based, *Undangan* admission system by comparing the academic performance of university students admitted through *Undangan* and test-based admission. In short, this study is broken into five parts. The first and ongoing part is the background of the study. Second, a literature review of similar previously conducted studies is included. The third section covers the methodologies used in the study. Results and discussions are presented in the fourth section. The fifth and final section consists of policy recommendations and concluding remarks. Limitations faced by this study are also present in the last part.

2. Literature Review

As previously mentioned, the presence of Indonesia-based literature covering the topic is limited. However, comparisons between the merit-based and test-based admissions, while not exactly similar to the *Undangan* and *SBMPTN* systems, have been conducted across the globe. For instance, numerous studies have conducted such comparisons between the SAT and high-school records in the United States. It is crucial to note that the American admission system is mainly through a screening process, unlike the process conducted in Indonesia. Despite that, students are still required to include SAT scores and high-school records for the screening, thus the two are instead evaluated on how good they are as predictors of university-level academic performance.

There has been a significant body of literature suggesting that both SAT scores and high-school records are strong predictors of post-secondary academic performance (Astin et al., 1987; Camara and Echternacht, 2000; Fleming, 2002; Kim, 2002; Moffat, 1993; Ramist et al., 1994; Synder et al., 2003; Tross et al., 2000; Waugh et al., 1994; Wolfe and

[3]It is important to note that while both are test-based admissions, SBMPTN is the nation-wide admission process, while university selections are conducted by each university.

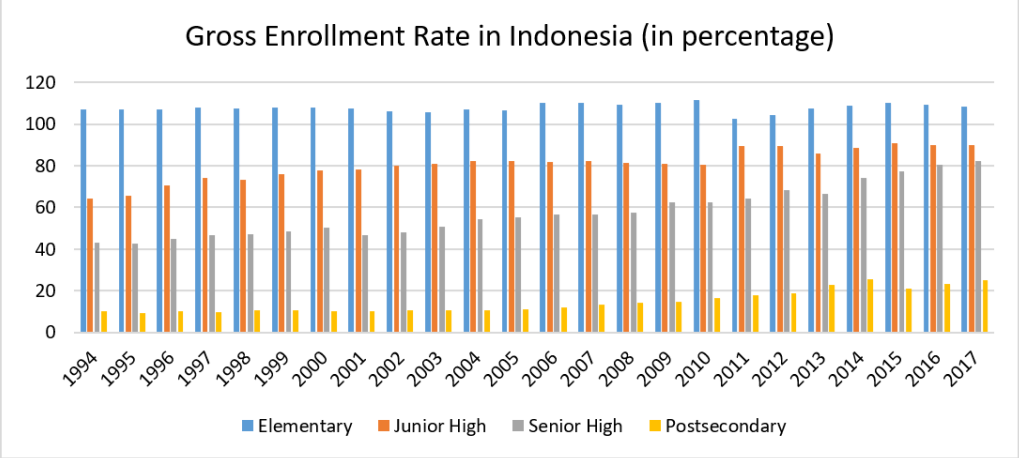

Figure 1. Gross Enrollment Rate in Indonesia (in percentage), 1994-2017
Source: Badan Pusat Statistik (BPS)

Johnson, 1995). As this study aims to make comparisons between the two, however, previous studies pointing either system to be the better predictor will be discussed more thoroughly.

Hoffman and Lowitzki (2005) used a sample of 522 minority students attending a predominantly White Lutheran university in Northwestern United States. The two discovered that high-school records were generally the better predictor of academic performance than SAT scores. Another study using the academic performance data of freshmen from the Iowa State University and the Cooperative Institutional Research Program (CIRP) data also found that high school rank, among others, was strongly related to academic performance (Zheng et al., 2002).

Similarly, Geiser and Studley (2002) found conforming results from a sample of 80,000 students of the University of California. The study demonstrated that high-school grade point average (HSGPA) was the best predictor of the students' freshman grades. A follow-up study was conducted by Geiser and Santelices (2007) to further see the relationship in a longer time period. Similarly, HSGPA was found to consistently be the best predictor of the students' academic performance in a four-year college period. Interestingly, the predictive weight increases as students progress into their sophomore year and beyond. Numerous other studies in the body of literature reported similar findings (Hoffman, 2002; Lawlor et al., 1997; Munro, 1981).

Results suggesting the contrary are also present. In an evaluation on the specific case of postgraduate medical school admission, Julian (2005) showed that standardized test scores are twice the better predictor of the admitted students' performance compared to their GPA in their previous education. Zwick and Sklar (2005) also reported in their study that standardized test scores are better predictor for the Hispanic and white students in the sample. Meanwhile, Noble and Sawyer (2004) mentioned a similar finding, in which ACT score was proved to be more effective in predicting the success of first-year GPA levels.

The predictive validity of demographic (Berger, 1997; Betts and Morell, 1998; Elkins et al., 1998; Pascarella et al., 1989; Pike et al., 1997), psychosocial (Nisbet et al., 1982; White and Sedlacek, 1986), and other factors (Astin, 1993; Hickman et al., 2000; House, 1996; Pascarella, 1985; Sandefur and Wells, 1999; Ting and Robinson, 1998; Tinto, 1993; Zalaquett, 1999), while not in the focus of this study, are covered by numerous other studies.

In summary, existing literature has demonstrated evidences of strong predictive validity of the two variables being compared, standardized test scores and high school records, towards university-level academic performance. The question on which one is the better predictor, however, still needs further research to be thoroughly addressed. As mentioned in the previous section, this study aims to contribute to the ongoing expansion of literature covering the topic. Taking the specific case of Indonesia as the focus, the results of this study are hoped to provide additional insights both to the relevant practitioners and policymakers in the country and the general public concerned about the discussion.

3. Methodology

3.1 Data and Sample

This study uses the data from the *SIAK-NG* (*Sistem Informasi Akademik Next Generation*), consisting of the academic, demographic, and admission system information of the students. The sample is all the admitted University of Indonesia's faculty of economics regular students (*FEB UI*) since 2001. More specifically, it includes students across 17 batches; from those admitted in 2001 up to those in 2017. In total, there are approximately 5,470 students analyzed.

3.2 Data Analysis

There are three steps of statistical inferences used in this study. First, to see the overall difference between the academic performances of the *Undangan* (merit-based) and test-based admittees, the study uses a simple significance of difference test between the two population. Secondly, this study attempts to disentangle the effects between the control variables and the variables in focus of the discussion by utilising regression analysis. The final step is the inclusion of a propensity score matching (PSM) analysis. PSM is used to further see the differences of academic performance not only in general, but also between the admitted students that are similar in characteristics and demographics.

3.3 Significance of Differences Testing

The first analysis is straightforward. Controlling the admission process of the students, the study classifies them into two populations, which are the test-based and merit-based population. T-statistics differences testing is used to determine whether the two populations differ in academic performance. The hypotheses used are as follow:

$$H_0 : \bar{x}_{\text{Undangan admittees}} \leq \bar{x}_{\text{test-based admittees}}$$
$$H_a : \bar{x}_{\text{Undangan admittees}} > \bar{x}_{\text{test-based admittees}}$$

Such hypotheses are chosen due to the sequence of which the admission process is conducted. The *Undangan* admission is done earlier, leaving the rejected and the ineligible (supposedly the "inferior" students) to compete for the remaining spots in the test-based admissions.

3.4 Estimation using Regression

In this part of the study, an ordinary least-square regression is utilized. The econometric model used is as follow:

$$GPA = \beta_0 + \beta_1 Undangan + \delta_i X$$

Where: GPA is the grade point average; *Undangan* is a dummy variable of admission process (1 = admitted through *Undangan*); and X is a vector of control variables.

As well as being a proxy of academic performance, the grade point average (GPA) is used as the dependent variable. *Undangan* is a dummy variable denoting the admission process each student has gone through; a value of 1 implying an entry by *Undangan* system, with a value of zero suggesting the otherwise. X is a vector of control variables that are gathered from the *SIAK-NG* database. These variables include gender, major (e.g. accounting, management, and economics), parents' income, parents' education, and high-school major.

$H_0 : \beta_1 \leq 0$; *Undangan* admittees perform relatively worse or at most equally
$H_a : \beta_1 > 0$; *Undangan* admittees perform relatively better

Similar to the previous section, in accordance to the focus of the study, the above hypotheses are the relevant for policy evaluation. The significance of other control variables are also considered and discussed.

3.5 Estimation using Propensity Score Matching

The last analysis used is a propensity score matching (Rosenbaum and Rubin, 1983). While the method is generally used for establishing the extent of differences following an intervention on one population, this study argues that the required conditions and circumstances hold for the comparison. In fact, the data this study encounter comply strongly to the assumptions a good PSM method is conducted under. For instance, the "treatment" (in this case the *Undangan* process) causes absolutely no spill-over effect to the "untreated" (the population not admitted through *Undangan*), which is supposedly very difficult to be even be minimized. The rationale of using the method is also reasonable, as PSM enables inferences to be made between different admittees possessing similar characteristics.

First, the probability propensity score (PPS) is defined as:

$$p(x) = P(Undangan = 1|x)$$

Under the independence assumption, the effects of *Undangan* on academic performance is identified as follow:

$$E[GPA_1 - GPA_0|p(x)] = E[GPA|Undangan = 1, p(x)] - E[GPA|Undangan = 0, p(x)]$$

Taking the average over the distribution of PPS in the students admitted through *Undangan*, the average treatment effect of the treated are defined as follow:

$$ATE_1^{PSM} = E\{E[GPA|Undangan = 1, p(x)] - E[GPA|Undangan = 0, p(x)]|Undangan = 1\}$$

The estimation of the PPS are conducted using probit between the *Undangan* dummy and the control variables that are used to make the pairwise matching. In total, we estimate five models; the first using the overall data, while the others use clustered data for every 4 years. We do so to minimize the possibility of biased inferences due to changing scoring standards across time.

4. Results and Discussions

4.1 Data and Sample Description

In total, we gather a sample of 5,470 students across 17 batches of admissions into the Faculty of Economics and Business (FEB UI) from 2001 to 2017. Such pool of students is obtained from the online academic performance depository of Universitas Indonesia, the top-ranked university in Indonesia during the writing of this study. The average grade point average (GPA), our main dependent variable, is at 3.33 out of 4. Students admitted through the *Undangan* method stand at roughly 28 percent of the sample. Meanwhile, 43 percent are male students and 48 percent originate from science major during high schools[4].

We would then proceed to describe the distribution of GPA as we classify the students based on the control variables. In particular, we are interested to see the distribution of the *Undangan* and non-*Undangan* students across departments, genders, parents' educational levels, and parents' income levels.

Generally, the distribution of *Undangan* students and gender are evenly matched. Noticeably, when classifying by departments, parental income, and parental education, certain concentrations are present. Observing Figures 2 to 6, the sample is more concentrated in the accounting and management departments. Most of the students are also concentrated in the second income classification, i.e. having parents with monthly income of Rp 1 Million up to Rp 6 Million. Similar to mother's education level, the distribution of students' father's education level is concentrated in the secondary and post-secondary classifications.

Next, we proceed to specifically observe the differences of academic performance while controlling several control variables. Particularly, the control variables of interest are

[4] Indonesia's secondary education system is divided into two concentrations i.e. the science and social science majors.

departments, gender, science or social science high school major, parental income, and parental education. Observing Figures 7 to 12, it is clear that generally the *Undangan* students perform better.

While the preliminary explorations in our study suggest that students admitted through the prior, merit-based intake system are superior, we will delve further into the discussions by dissecting the performance differences across time. Comparing the two populations with simple t-tests, we obtain Table 3.

Before taking inferences, it is important to note that the low number of *Undangan* students in the early 2000's is due to allocation matters. As the time progresses, more quota is given for such admission method. However, an intriguing pattern is arguably present in the above table. *Undangan* students in the 2006 to 2010 intake performed under peak superiority. More recent intakes, however, do not display such stark difference.

4.2 Regression Estimates

We further investigate above mentioned trends in this section. Similar to Table 3, we attempt to observe whether such difference exists while incorporating several control variables using least-squares regression estimates. The regressions are done once for each year, topped with estimates from the pooled data. The estimates are presented in Table 4.

In the above table, we could notice a similar pattern to the one we observed in Table 2. Generally, there was a stint of superiority period owned by the *Undangan* students compared to the others, from the 2006 to 2009 intakes. However, in the recent intakes, differences diminished. We shall discuss the findings more thoroughly in one of the upcoming sections.

4.3 Matching Estimates

Delving deeper, we attempt to see whether students with similar characteristics perform differently if compared between their admission methods, i.e. the *Undangan* and non-*Undangan* admission. Particularly, we matched the students controlling their parents' education level, high school major, parents' income level, gender, religions, and departments. As mentioned before, we utilized 5 models; one for each four (and five) years cluster, and one for the pooled data. Table 5 presents the results.

A rather similar outcome is observed – the *Undangan* students perform better generally. However, as we noted in the previous estimations, such superiority decreased over time. Such notion is observable by comparing estimations (2) to (5). The effects decrease, so did the significance levels.

4.4 Post-estimation Checks

Here, we briefly describe the post-estimation measures we conducted in assessing the models and methodologies that we used. First, we checked the correlations between independent variables to see whether any alarming degree of multicollinearity occurs. Figure 13 visualizes the correlation matrix.

Mostly, correlations between variables are mild. Notable figures are observable between the departments and parents' education levels. Interaction variables also, expectedly, show correlations between each other. However, after independently conducting subset regressions, we deem the current model is explainable enough as no significant differences (e.g. significance or sign changes) is noted.

As for the matching methods, we also check for any violation on the overlap assumption graphically. That is, we are interested to see whether there is any notable subset of students with non-positive probability of receiving treatment (being an *Undangan* student in our case). The results are shown in Figures 14 to 18.

Generally, we deem the assumptions to not be violated. Neither of the common support graphs above depict too much probability near the extremes, while almost all the regions are within the overlapping masses.

5. Discussions

In this section, we discuss the above findings in more detail. Regarding the main dependent variable, students admitted through the *Undangan* method are better academically. However, the difference diminishes across time, as the figures peaked on the 2006 to 2009 intakes. The results are consistent throughout all the inferential estimates mentioned above. This could bring important implications for the related policymakers. *Undangan* has proven to be a good measure to admit the better students; however, the effectiveness of such method has not been showing encouraging signs of late. With the government tinkering with the allocations every year, the above results may provide additional input.

One of the explanations to the results we gathered is the possibility that the schools with better accreditations (which are earned by having more students admitted) to be sending their barely adequate students to the universities through the *Undangan* method. To some extent, that points to the complacency of the schools. With our findings, such occurrence is very much possible; however, further studies are needed to be conducted to see whether such specific case holds. The figures in our yearly estimates suggest so, if we are to assume that the 'number of alumni' criteria to be one of the main determinants of the *Undangan* admission.

Noticeably, the screening process could possibly be hampered by a massive asymmetry of information between the agents involved. The admissions committee could only observe the scores submitted by schools with high variability of grading standards. While unlikely, the possibility for a genius prospective student in a school where obtaining high grades to not be admitted while a relatively inferior student in a similarly ranked school where getting good scores is easier is accepted is present.

Problems may also occur due to the presence of *Undangan* system's selection criteria such as numbers of alumni from the same school admitted and their performance in their respective universities. Universities are faced with the asymmetry of information, and such criteria would only hinder the lesser schools getting any chance. Such condition amplifies the scope of the problem, possibly becoming an admission process burdened by a cycle of bounded rationality as the criteria are used in a yearly basis. All the previously mentioned problems' existence, however, could

only be determined by conducting a large-scale evaluation.

Another potential explanation is the possibility of moral hazard issue in score reporting (e.g., dishonest score submission, undeserved mark-ups of scores) for the schools to get their students admitted, thus giving an even better reputation for the school. While the claim itself is bold, it might be another explanation as to why the difference of academic performance has been diminishing between the *Undangan* and non-*Undangan* students. Further researches are required, obviously, and investigative studies would be beneficial for the related policymakers and stakeholders in assessing the claim.

Even under the bold assumption that the grading among schools nationally are of similar standards, the incentives for the schools to grade justly are still arguably low. A simple principal agent problem could be observed, in which the efforts of the schools (agents) to grade and report justly to the universities and admission committees (principal) may not be optimal, especially given that the nomination process is unobservable. The previously mentioned competition among schools may also shift their incentives, discouraging them to report a more objective, separating signalling of their students' academic performance.

It is crucial to note that the earlier expositions are not to scrutinize the practice of the existing system, but rather to give a vivid explanation on why this study argues that the standardization in particular admission system is relatively weaker. Noticeably, our results suggest that its competitiveness has also been decreasing across the years. We argue that such asymmetry of information, along with the apparent incentives of the schools to not make such separating signaling, may force the universities to admit students under a bounded rationality condition.

In short, there is a possibility that the *Undangan* admission method did admit the best students during its 'peak' period of students in 2006 to 2009. Rightly so, such performance may encourage the government to formalize the nation-wide merit-based system in 2011, and further in 2013, to admit an even bigger portion of students with this 'proven' method. When enacted massively, however, the effectiveness was hindered by the possible cycles of principal-agent problems we described above. With the problems continuously occurring in a yearly basis, the effects are multiplied as the number of alumni and accreditations criteria are considered to be admitted through *Undangan*. Further research is needed, inevitably, to confirm the validity of the explanations.

The complete opposite of the above problems is possible, of course. The diminishing differences between the academic performance of *Undangan* and non-*Undangan* students might also be caused by the increasing standards and competitions between the students at high school level. Assuming so, there is a higher possibility that even if a student is not accepted in the *Undangan* stage, she is still a student decent enough to compete with the *Undangan*-admitted students in her school. She would then proceed to take the test-based admissions successfully and perform well in the university level. Either way, the result provides sound justification for the government's move of reducing the number of students admitted through the *SNMPTN Undangan* method.

Several other interesting inferences could be noted too from the above results. We could see that, predictably, parents' income level is a significant predictor. Sporadically, several intakes show that students coming from wealthier families tend to do better academically. This finding contributes into the literature regarding the relationship between the two aspects. However, when we attempted to conduct estimations using the income and *Undangan* interaction, the results were insignificant.

In line with the previous literature, female students perform better academically. Across all the intakes, female students significantly outperformed their male colleagues. Interestingly, when we look at the gender and *Undangan* interaction variable, the results are reversed. In several intakes, it is shown that the male students perform better if they are admitted through *Undangan*. As we observe such differences across the departments, the results suggest that student scores across departments are rather similar.

Furthermore, students originating from science major at high schools are also shown to perform better, consistently. The finding contributes in the lengthy discussions of high school majors in Indonesia, as for decades the science major has been touted as the 'holy grail' between the two (science and social science major). Empirical results suggest that such view is, so far, justified to some degree. Interestingly, as we interact the variable with *Undangan*, the results are mixed. Before the 2008 intake, the estimates are generally insignificant. After that, the estimates show positive growth indicating the possible, academically proven superiority of the science major to exist.

Another interesting finding is noted if we consider the parents' educational level's role on determining academic performance. Negative, significant relationships are recorded sporadically, implying that students whose parents are less educated perform better. The occurrence contributes to the mixed line of researches regarding the notion, as several show similar relationships while others suggest otherwise. If the phenomenon is generalizable, we could argue that it probably occurs because the students with such parents are more determined to change the lives of their family and their future.

6. Concluding Remarks

Educational achievements and their determinants are always a complex matter. Our study contributes to the discussion by providing rigorous and thorough exploration of some further evidence from Indonesia's higher education. We argue that our sample depict a rather unique case in which the merit-based and test-based admissions are done completely in a separate manner. Furthermore, the merit-based admissions are done prior to the test-based admissions, calling for evaluations whether such system would be justified.

Results suggest that the students admitted through the merit-based admission system (*Undangan*) perform generally better than those admitted through the test-based system, despite such superiority diminishing across time. To some degree, our findings justify the government's move to reduce the number of merit-based admitted students of late. It is important to note, however, that the above results are gathered from a very specific faculty in one of Indone-

sia's leading universities. Further studies with an even larger sample would be beneficial and necessary, if we are to see whether the occurrences above also happen at the national level.

More studies conducted in a more qualitative and investigative manner are also welcomed. As we described above, the reasoning as to why the differences diminished in recent years calls for further investigations. Finally, we hope that the above results may help the related policymakers and stakeholders to not only get a better understanding of the higher education system, but also make the relevant policies necessary to make the institution better.

References

Astin, A. W. (1993). *What matters in college? Four critical years revisited*. San Francisco: Jossey-Bass.

Astin, A., Green, K. C., & Korn, W. S. (1987). *The College Freshman: Twenty Year Trends*. Los Angeles: Higher Education Research Institute.

Avis, J. (2002). Social capital, collective intelligence and expansive learning: Thinking through the connections. Education and the economy. *British Journal of Educational Studies, 50*(3), 308–326.

Berger, J. B. (1997). Students' sense of community in residence halls, social integration, and first-year persistence. *Journal of College Student Development, 38*, 441–452.

Betts, J. R., & Morell, D. (1998). The determinants of undergraduate grade point average. *The Journal of Human Resources, 34*, 268–293.

Camara, W. J., & Echternacht, G. (2000). The SAT I and high school grades: Utility in predicting success in college. *College Board Research Notes (RN-10)*. New York: College Board.

Elkins, S. A., Braxton, J. M., & James, G. W. (1998). Tinto's separation stage and its influence on first-semester college student persistence. *Paper presented at the Annual Forum of the Association for Institutional Research, Minneapolis, MN. (ERIC Document Reproduction Service No. ED 424 799)*.

Fleming, J. (2002). Who will succeed in college? When the SAT predicts Black students' performance. *Review of Higher Education, 25*(3), 281–296.

Geiser, S., & Santelices, M. V. (2007). Validity of High-School Grades in Predicting Student Success beyond the Freshman Year: High-School Record vs. Standardized Tests as Indicators of Four-Year College Outcomes. *Research & Occasional Paper Series: CSHE. 6.07*. Center for Studies in Higher Education.

Geiser, S., & Studley, W. R. (2002). UC and the SAT: Predictive validity and differential impact of the SAT I and SAT II at the University of California. *Educational Assessment, 8*(1), 1–26.

Harris, D. N., Handel, M. J., & Mishel, L. (2004). Education and the economy revisited: How schools matter. *Peabody Journal of Education, 79*(1), 36–63.

Hickman, G. P., Bartholomae, S., & McKenry, P. C. (2000). Influence of parenting styles on the adjustment and academic achievement of traditional college freshmen.*Journal of College Student Development, 41*(1), 41–54.

Hoffman, J. L. (2002). The impact of student co-curricular involvement on student success: Racial and religious differences. *Journal of College Student Development, 43*(5), 712–739.

Hoffman, J. L., & Lowitzki, K. E. (2005). Predicting college success with high school grades and test scores: Limitations for minority students. *The Review of Higher Education, 28*(4), 455–474.

House, D. J. (1996). College persistence and grade outcomes: Noncognitive variables as predictors for African-American, Asian-American, Hispanic, Native American, and White students. *Paper presented at the Annual Forum of the Association for Institutional Research, Albuquerque, NM. (ERIC Document Reproduction Service No. ED 397 710)*.

Julian, E. R. (2005). Validity of the Medical College Admission Test for predicting medical school performance. *Academic Medicine, 80*(10), 910–917.

Kim, M. M. (2002). Historically Black vs. White institutions: Academic development among Black students. *Review of Higher Education, 25*(4), 385–407.

Lawlor, S., Richman, S. & Richman, C. L. (1997). The Validity of Using the SAT as a Criterion for Black and White Students' Admission to College. *College Student Journal, 31*, 507–515.

London, R. A. (2006). The role of postsecondary education in welfare recipients' paths to self-sufficiency. *The Journal of Higher Education, 77*(3), 472–496.

Moffat, G. K. (1993). The validity of the SAT as a predictor of grade point average for nontraditional college students. *Paper presented at the annual meeting of the Eastern Educational Research Association, Clearwater Beach, FL. ERIC Document Reproduction Service No. ED 356 252*.

Munro, B. H. (1981). Dropouts from higher education: Path analysis of a national sample. *American Educational Research Journal, 18*(2), 133–141.

Nisbet, J., Ruble, V. E., & Schurr, K. T. (1982). Predictors of academic success with high-risk college students. *Journal of College Student Personnel, 23*, 227–235.

Noble, J. P., & Sawyer, R. L. (2004). Is high school GPA better than admission test scores for predicting academic success in college?. *College and University, 79*(4), 17.

Pascarella, E. T. (1985). The influence of on-campus living versus commuting to college on intellectual and interpersonal self-concept. *Journal of College Student Personnel, 26*, 292–299.

Pascarella, E. T., Smart, J. C., & Stoecker, J. (1989). College race and the early status attainment of black students. *Journal of Higher Education, 60*(I), 82–107.

Pike, G. R., Schroeder, C. C., & Berry, T. R. (1997). Enhancing the educational impact of residence halls: The relationship between residential learning communities and first-year college experiences and persistence. *The Journal of College Student Development, 38*, 609–621.

Ramist, L., Lewis, C., & McCamley-Jenkins, L. (1994). Student group differences in predicting college grades: Sex, language, and ethnic groups. *College Board Report No. 93-1*. New York: College Entrance Examination Board.

Rosenbaum, P. R., & Rubin, D. B. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika, 70*, 41–55.

Sandefur, G. D., & Wells, T. (1999). Does family structure really influence educational attainment? *Social Science Research, 28*, 331–357.

Snyder, V., Hackett, R. K., Stewart, M.& Smith, D. (2003). Predicting academic performance and retention of private university freshmen in need of developmental education. *Research & Teaching in Developmental Education, 19*(2), 17–28.

Ting, S. R., & Robinson, T. L. (1998). First-year academic success: A prediction model combining cognitive and psychosocial variables for European and African Americans. *Journal of College Student Development, 39*, 599–610.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition (2nd ed.)*. Chicago: University of Chicago Press.

Tross, S. A., Harper, J. P., Osher, L. W., & Kneidinger, L. M. (2000). Not just the usual cast of characteristics: Using personality to predict college student performance and retention. *Journal of College Student Development, 41*(3), 323–334.

Waugh, G., Micceri, T., & Takalkar, P. (1994). Using ethnicity, SAT/ACT scores, and high school GPA to predict retention and graduation rates (Report No. HE034024). Orlando, FL: Florida Association for Institutional Research. *(ERIC Document Reproduction Service No. ED453704)*.

White, T. J., & Sedlacek, W. E. (1986). Non-cognitive predictors: Grades and retention of specially admitted students. *Journal of College Admissions, 3*, 20–23.

Wolfe, R. N., & Johnson S. D. (1995). Personality as a predictor of college performance. *Educational and Psychological Measurement, 55*(2), 177–185.

Zalaquett, C. P. (1999). Do students ofnoncollege-educated parents achieve less academically than students ofcollegeeducated parents? *Psychological Reports, 85*, 417–421.

Zwick, R. (Ed.). (2004). *Rethinking the SAT: The future of standardized testing in university admissions*. Psychology Press.

Zwick, R., & Sklar, J. C. (2005). Predicting college grades and degree completion using high school grades and SAT scores: The role of student ethnicity and first language. *American Educational Research Journal, 42*(3), 439–464.

Appendix

Table 2. Descriptive Statistics of Main Variables

	n	Mean	S.D.	Min	Q1	Median	Q3	Max
Grade Point Average	5,470	3.33	0.31	2	3.12	3.34	3.57	4
Undangan	5,470	0.28						
Male	5,470	0.43						
Science Major in High School	5,470	0.48						

Source: Calculated by the authors

Table 3. Grade Point Average Differences between *Undangan* and non-*Undangan* Student of FEB UI 2001-2017

Batch	Admission	N	Mean GPA	t	p-value
2001	Non-*Undangan*	268	3.09	**-2.12****	**0.02**
	Undangan	24	3.25		
2002	Non-*Undangan*	408	3.08	**-3.15*****	**0.00**
	Undangan	36	3.3		
2003	Non-*Undangan*	148	3.09	**-4.58*****	**0.00**
	Undangan	18	3.41		
2004	Non-*Undangan*	168	3.17	-0.67	0.26
	Undangan	20	3.22		
2005	Non-*Undangan*	276	3.24	-0.11	0.46
	Undangan	21	3.25		
2006	Non-*Undangan*	203	3.22	**-4.32*****	**0.00**
	Undangan	55	3.39		
2007	Non-*Undangan*	307	3.27	**-6.67*****	**0.00**
	Undangan	49	3.51		
2008	Non-*Undangan*	375	3.26	**-6.97*****	**0.00**
	Undangan	43	3.49		
2009	Non-*Undangan*	352	3.28	**-5.91*****	**0.00**
	Undangan	60	3.5		
2010	Non-*Undangan*	252	3.33	**-3.65*****	**0.00**
	Undangan	90	3.44		
2011	Non-*Undangan*	134	3.36	-0.47	0.32
	Undangan	250	3.37		
2012	Non-*Undangan*	184	3.41	**-2.01****	**0.02**
	Undangan	176	3.47		
2013	Non-*Undangan*	145	3.44	-0.87	0.19
	Undangan	163	3.46		
2014	Non-*Undangan*	147	3.41	**-3.35*****	**0.00**
	Undangan	133	3.5		
2015	Non-*Undangan*	135	3.43	-1.28	0.10
	Undangan	148	3.47		
2016	Non-*Undangan*	189	3.41	-1.23	0.11
	Undangan	132	3.45		
2017	Non-*Undangan*	239	3.61	**-2.50****	**0.01**
	Undangan	122	3.67		

Source: Calculated by the authors

Table 4. Regression Results of *Undangan* and Control Variables Effects on Academic Performance of FEB UI students 2001–2017

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable	All batches	2001	2002	2003	2004 GPA	2005	2006	2007	2008
Undangan	**0.148*** **	0.0760	-0.00944	**0.330*** **	-0.0547	-0.0312	**0.154** **	**0.232*** **	**0.196*** **
	(0.0121)	(0.0963)	(0.112)	**(0.0826)**	(0.109)	(0.0854)	**(0.0596)**	**(0.0565)**	**(0.0523)**
Parents' Income (Baseline: Less than 1 Million Rupiah)									
1 Million to 6 Million Rupiah	**0.0959*** **	0.0648	**0.102** **	-0.0367	0.0169	**0.0746** **	-0.0474	-0.00100	-0.0247
	(0.0130)	(0.0402)	**(0.0411)**	(0.0462)	(0.0499)	**(0.0373)**	(0.0441)	(0.0569)	(0.0369)
6 Million to 10 Million Rupiah	**0.154*** **	-0.105	-0.0685	-0.0226	0.0330	**0.120** **	-0.0704	-0.0232	-0.0732
	(0.0162)	(0.115)	(0.0683)	(0.0702)	(0.0743)	**(0.0508)**	(0.0640)	(0.0673)	(0.0478)
10 Million to 20 Million Rupiah	**0.199*** **	0.111	0.127	-0.0484	0.106	0.0524	0.0164	**-0.161** **	**-0.122** **
	(0.0175)	(0.123)	(0.106)	(0.0888)	(0.0977)	(0.0794)	(0.0842)	**(0.0765)**	**(0.0583)**
More than 20 Million Rupiah	**0.236*** **		**-0.272*** **	-0.123	-0.132	0.000619	-0.148	**-0.160** *	**-0.177*** **
	(0.0190)		**(0.0619)**	(0.158)	(0.0950)	(0.106)	(0.157)	**(0.0853)**	**(0.0639)**
Male	**-0.134*** **	**-0.247*** **	**-0.192*** **	**-0.186*** **	**-0.157*** **	**-0.115*** **	**-0.202*** **	**-0.112*** **	**-0.158*** **
	(0.00951)	**(0.0351)**	**(0.0305)**	**(0.0436)**	**(0.0415)**	**(0.0297)**	**(0.0406)**	**(0.0302)**	**(0.0282)**
Male x Undangan	**0.0749*** **	**0.373** *	**0.261** *	**0.276** **	0.0598	0.0557	0.0629	0.0678	0.0606
	(0.0189)	**(0.199)**	**(0.144)**	**(0.135)**	(0.140)	(0.142)	(0.0890)	(0.0846)	(0.0613)
Science High School Major x Undangan	-0.0102	-0.0939	0.172	**-0.281*** **	0.0831	0.0412	-0.0998	-0.0418	-0.00694
	(0.0171)	(0.152)	(0.142)	**(0.102)**	(0.129)	(0.122)	(0.0759)	(0.0735)	(0.0623)
Father's Education (Baseline: Primary)									
Secondary	0.000687	0.0508	-0.0320	-0.1000	-0.00853	0.0178	-0.102	0.0917	0.0972
	(0.0230)	(0.106)	(0.0904)	(0.0710)	(0.0826)	(0.0943)	(0.0842)	(0.0871)	(0.0906)
Post-secondary	**-0.0423** *	-0.00369	-0.0670	-0.0771	-0.0118	-0.0248	**-0.156** *	0.0804	0.00910
	(0.0239)	(0.108)	(0.0966)	(0.0754)	(0.0868)	(0.0971)	**(0.0896)**	(0.0918)	(0.0927)
Post-graduate	**-0.0518** **	0.0184	-0.0666	-0.0910	0.0410	-0.0648	-0.105	0.140	-0.0265
	(0.0254)	(0.118)	(0.102)	(0.0865)	(0.0932)	(0.101)	(0.0974)	(0.0971)	(0.0965)
Mother's Education (Base: Primary)									
Secondary	-0.00462	-0.0947	0.0761	**-0.137** *	-0.00882	-0.0655	0.0392	0.00173	-0.00196
	(0.0206)	(0.0621)	(0.0693)	**(0.0730)**	(0.0662)	(0.0932)	(0.0750)	(0.0869)	(0.0855)
Post-secondary	0.0135	-0.0817	0.0818	**-0.228*** **	-0.0430	-0.0463	0.0837	0.0218	0.0314
	(0.0217)	(0.0715)	(0.0746)	**(0.0779)**	(0.0731)	(0.0964)	(0.0803)	(0.0915)	(0.0870)
Post-graduate	-0.00175	-0.133	0.0687	-0.161	-0.117	-0.0698	-0.0165	-0.00981	0.0197
	(0.0254)	(0.127)	(0.0929)	(0.118)	(0.0842)	(0.106)	(0.142)	(0.117)	(0.0981)
Science High School Major	**0.107*** **	**0.129*** **	**0.202*** **	**0.137*** **	0.0661	**0.0916*** **	**0.0835** **	**0.110*** **	**0.131*** **
	(0.00953)	**(0.0350)**	**(0.0309)**	**(0.0450)**	(0.0478)	**(0.0275)**	**(0.0373)**	**(0.0321)**	**(0.0279)**
Accounting Department	0.0141	0.0432	-0.0124	**-0.183*** **	0.0573	0.0435	0.0493	0.0577	-0.0348
	(0.0109)	(0.0414)	(0.0364)	**(0.0641)**	(0.0593)	(0.0444)	(0.0425)	(0.0430)	(0.0394)
Management Department	0.00132	0.0176	0.0387	-0.100	0.0690	-0.00658	0.0289	-0.0113	0.0163
	(0.0109)	(0.0441)	(0.0387)	(0.0620)	(0.0603)	(0.0444)	(0.0409)	(0.0444)	(0.0420)
Constant	**3.193*** **	**3.138*** **	**2.961*** **	**3.487*** **	**3.179*** **	**3.228*** **	**3.336*** **	**3.155*** **	**3.271*** **
	(0.0231)	**(0.131)**	**(0.0765)**	**(0.0912)**	**(0.0835)**	**(0.0704)**	**(0.0922)**	**(0.0756)**	**(0.0710)**
Observations	5,470	292	444	166	188	297	258	356	418
R-squared	0.170	0.228	0.252	0.344	0.142	0.148	0.213	0.220	0.242

Robust standard errors in parentheses
*** p¡0.01, ** p¡0.05, * p¡0.1

continue...

...continued

	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Dependent Variable	2009	2010	2011	2012	2013 GPA	2014	2015	2016	2017
Undangan	**0.141****	0.0597	-0.0559	0.0701	-0.0286	**0.0850****	0.0521	-0.0259	0.0519
	(0.0563)	(0.0493)	(0.0535)	(0.0501)	(0.0407)	**(0.0426)**	(0.0512)	(0.0418)	(0.0332)
Parents' Income (Baseline: Less than 1 Million Rupiah)									
1 Million to 6 Million Rupiah	0.0143	**0.107***	0.0499	0.0513	0.0149	**0.197****	0.0513	0.119	0.0593
	(0.0518)	**(0.0638)**	(0.0569)	(0.0502)	(0.0923)	**(0.0956)**	(0.102)	(0.0724)	(0.0616)
6 Million to 10 Million Rupiah	0.0231	**0.118***	**0.120***	0.00228	0.0726	**0.273*****	0.128	0.0950	0.0642
	(0.0606)	**(0.0700)**	**(0.0652)**	(0.0570)	(0.0955)	**(0.103)**	(0.108)	(0.0835)	(0.0676)
10 Million to 20 Million Rupiah	0.0873	**0.175****	0.0762	0.0290	0.0700	**0.263****	0.0828	**0.186****	0.0428
	(0.0647)	**(0.0761)**	(0.0764)	(0.0639)	(0.0990)	**(0.102)**	(0.109)	**(0.0843)**	(0.0683)
More than 20 Million Rupiah	0.0318	**0.164***	**0.133***	0.0772	0.0826	**0.251****	0.0957	**0.221****	0.0674
	(0.0879)	**(0.0848)**	**(0.0779)**	(0.0689)	(0.100)	**(0.104)**	(0.114)	**(0.0854)**	(0.0685)
Male	**-0.177*****	**-0.167*****	**-0.146*****	**-0.133*****	**-0.0820****	**-0.120*****	**-0.119****	**-0.115*****	**-0.0900*****
	(0.0288)	**(0.0295)**	**(0.0480)**	**(0.0425)**	**(0.0368)**	**(0.0389)**	**(0.0513)**	**(0.0387)**	**(0.0332)**
Male x Undangan	**0.259*****	0.0904	0.104	0.0496	0.0441	**0.138****	5.82E-05	0.0902	0.0447
	(0.0975)	(0.0693)	(0.0637)	(0.0631)	(0.0514)	**(0.0632)**	(0.0729)	(0.0665)	(0.0521)
Science High School Major x Undangan	-0.0460	0.0469	**0.119****	0.00715	**0.128*****	0.00943	-0.0277	0.105	0.0925
	(0.0716)	(0.0573)	**(0.0581)**	(0.0579)	**(0.0482)**	(0.0712)	(0.0776)	(0.0681)	(0.0575)
Father's Education (Baseline: Primary)									
Secondary	0.0658	**-0.238****	**0.140****	0.0817	0.0721	-0.00461	-0.162	-0.0105	-0.0843
	(0.0716)	**(0.107)**	**(0.0669)**	(0.0669)	(0.0975)	(0.0917)	(0.110)	(0.121)	(0.0712)
Post-secondary	-0.00733	**-0.251****	**0.151****	0.0427	0.0243	0.0156	-0.114	-0.00651	-0.0631
	(0.0742)	**(0.105)**	**(0.0710)**	(0.0718)	(0.103)	(0.0985)	(0.112)	(0.129)	(0.0786)
Post-graduate	-0.00198	**-0.263****	**0.131***	0.123	-0.0138	0.0494	-0.124	0.0136	-0.104
	(0.0779)	**(0.110)**	**(0.0763)**	(0.0753)	(0.105)	(0.105)	(0.119)	(0.131)	(0.0818)
Mother's Education (Base: Primary)									
Secondary	**-0.147****	0.0734	-0.0414	0.0596	-0.0419	0.0562	0.106	0.136	-0.0847
	(0.0643)	(0.141)	(0.0605)	(0.0702)	(0.0856)	(0.0863)	(0.116)	(0.0855)	(0.0648)
Post-secondary	**-0.161****	0.0999	-0.101	0.0512	0.0449	-0.0345	0.0624	0.121	-0.0734
	(0.0665)	(0.145)	(0.0626)	(0.0734)	(0.0913)	(0.0946)	(0.118)	(0.0909)	(0.0700)
Post-graduate	**-0.193****	0.153	-0.115	0.0790	-0.0337	-0.0197	-0.00630	0.0753	-0.0568
	(0.0782)	(0.150)	(0.0860)	(0.0818)	(0.101)	(0.0998)	(0.137)	(0.0969)	(0.0798)
Science High School Major	**0.161*****	**0.0910*****	**0.101****	**0.135*****	**0.0611***	**0.103****	**0.164*****	0.0250	**0.0625***
	(0.0282)	**(0.0298)**	**(0.0472)**	**(0.0438)**	**(0.0360)**	**(0.0406)**	**(0.0528)**	(0.0373)	**(0.0335)**
Accounting Department	0.0177	**0.0759****	0.0248	-0.0468	**-0.0772****	0.0202	0.0709	-0.0155	**0.110*****
	(0.0425)	**(0.0344)**	(0.0391)	(0.0393)	**(0.0340)**	(0.0387)	(0.0435)	(0.0376)	**(0.0362)**
Management Department	0.0246	0.0282	0.0318	-0.0379	**-0.0692****	0.000948	0.00495	-0.0952**	-0.0491
	(0.0446)	(0.0322)	(0.0376)	(0.0404)	(0.0328)	(0.0355)	(0.0448)	**(0.0385)**	(0.0362)
Constant	**3.389*****	**3.358*****	**3.215*****	**3.268*****	**3.434*****	**3.163*****	**3.378*****	**3.253*****	**3.693*****
	(0.0784)	**(0.100)**	**(0.0840)**	**(0.0920)**	**(0.100)**	**(0.0970)**	**(0.139)**	**(0.122)**	**(0.0696)**
Observations	412	342	384	360	308	280	283	321	361
R-squared	0.240	0.231	0.168	0.152	0.183	0.194	0.137	0.137	0.172

Robust standard errors in parentheses
*** p¡0.01, ** p¡0.05, * p¡0.1

Table 5. Propensity-Score Matching Model of *Undangan* Status Effect on Academic Performance of FEB UI students 2001–2017

Propensity-Score Matching Model	(1) All	(2) 2001–2004	(3) 2005–2008	(4) 2009–2012	(5) 2013–2017
Treatment dependent: *Undangan*	**0.176*** (0.0142)**	**0.212*** (0.0455)**	**0.181*** (0.0223)**	**0.136*** (0.0180)**	**0.0424** (0.0174)**
Observations	5,470	1,090	1,329	1,498	1,553

Standard errors in parentheses
*** p¡0.01, ** p¡0.05, * p¡0.1

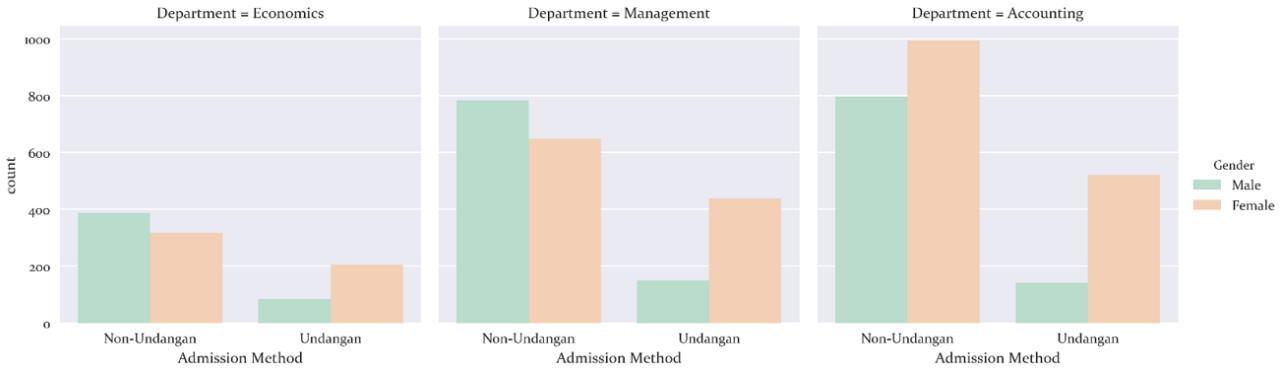

Figure 2. *Undangan* **and non-***Undangan* **Admitted Students Distribution across Departments**
Source: Calculated by the authors

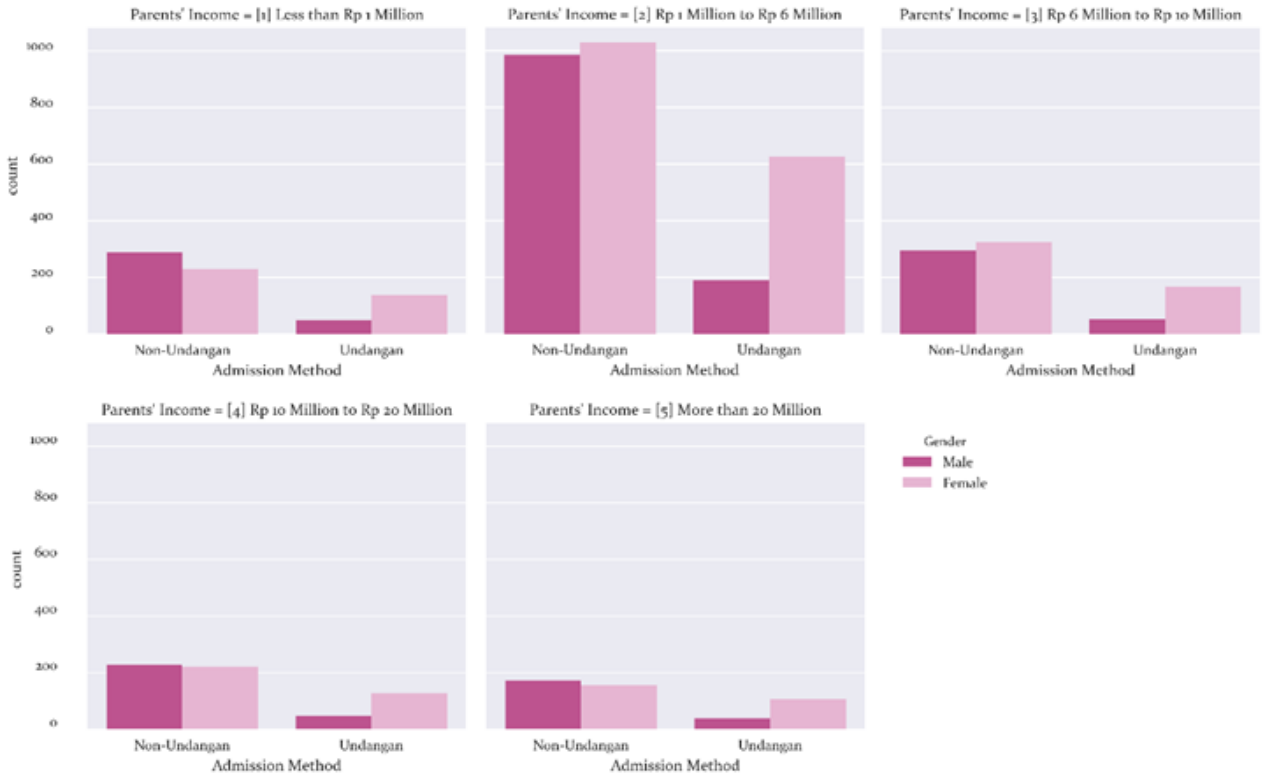

Figure 3. *Undangan* **and non-***Undangan* **Distribution across Different Parents' Income Levels**
Source: Calculated by the authors

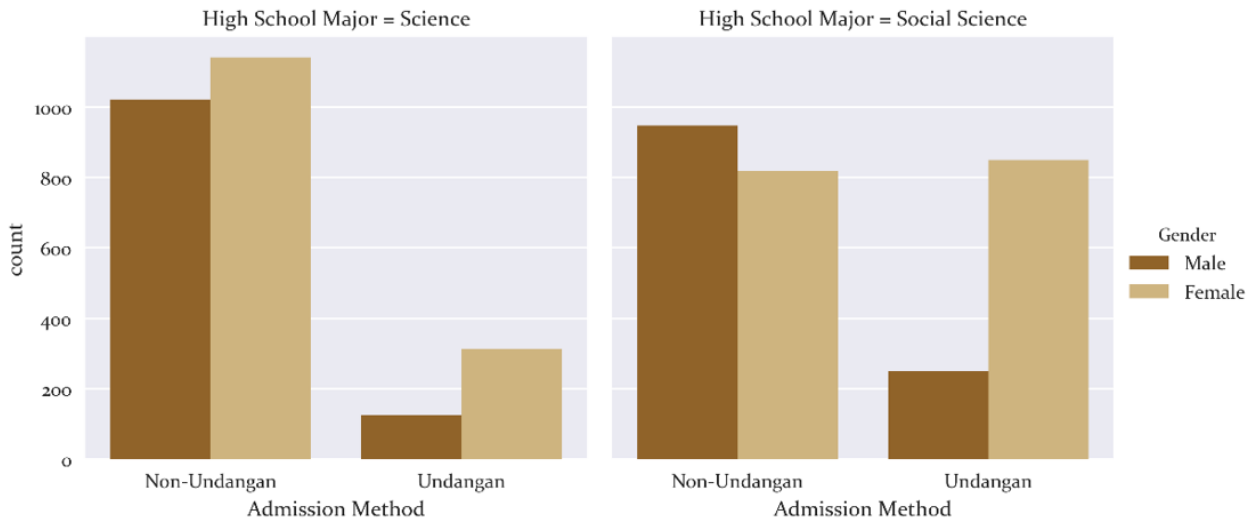

Figure 4. *Undangan* **and non-***Undangan* **Admitted Students Distribution by High School Major**
Source: Calculated by the authors

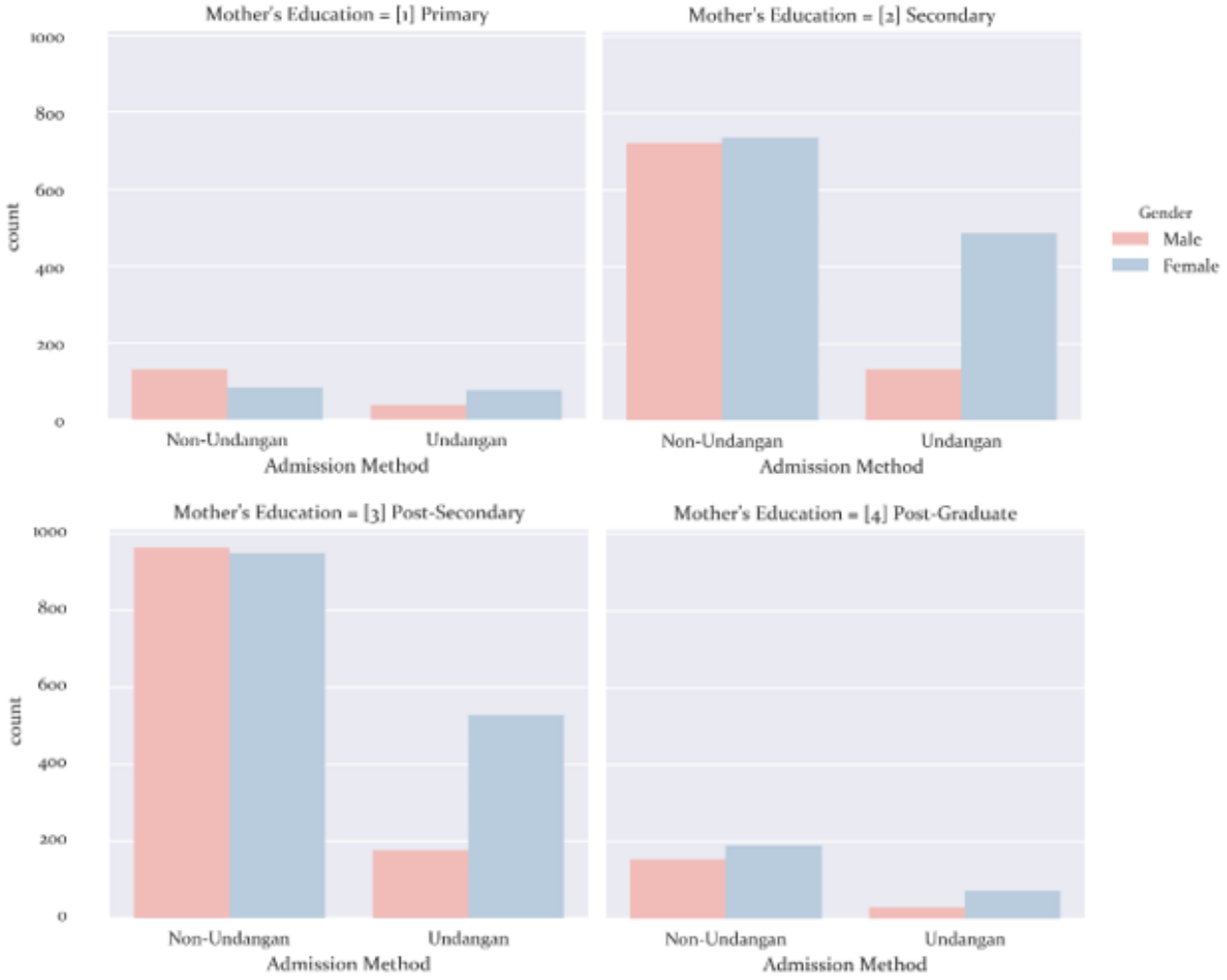

Figure 5. *Undangan* **and non-***Undangan* **Admitted Students Distribution across Different Parents' Educational Levels**
Source: Calculated by the authors

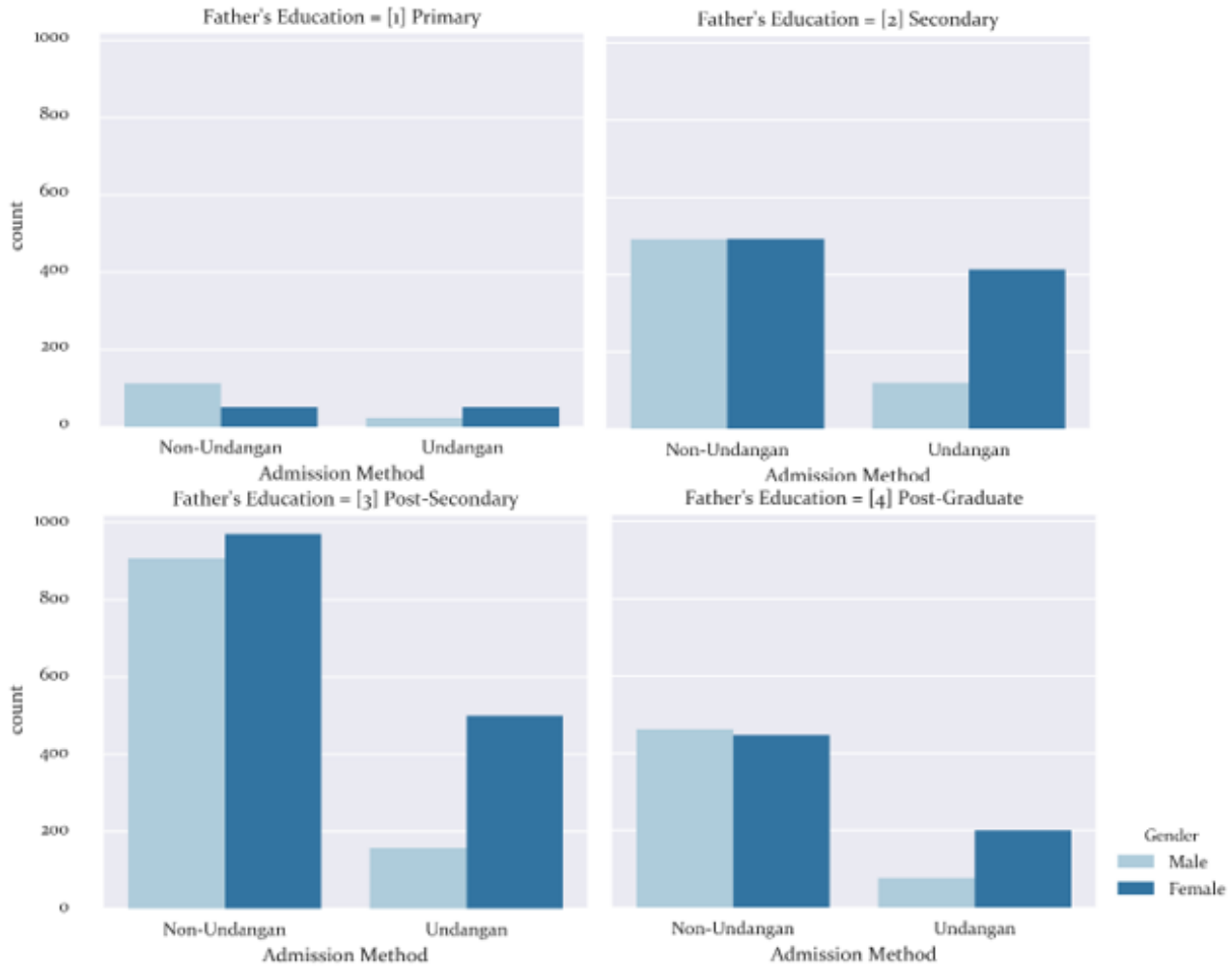

Figure 6. *Undangan* **and non-***Undangan* **Admitted Students Distribution across Different Parents' Educational Levels**
Source: Calculated by the authors

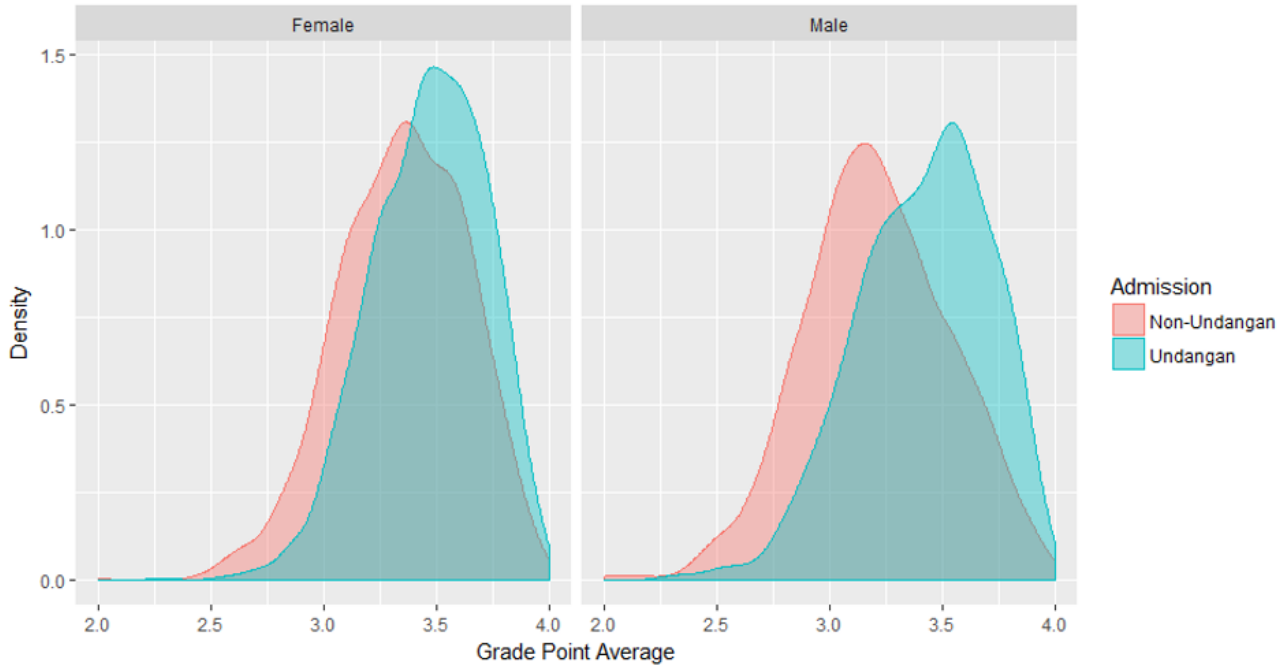

Figure 7. Grade Point Average Distribution between *Undangan* **and non-***Undangan* **Students by Gender and High School Major**
Source: Calculated by the authors

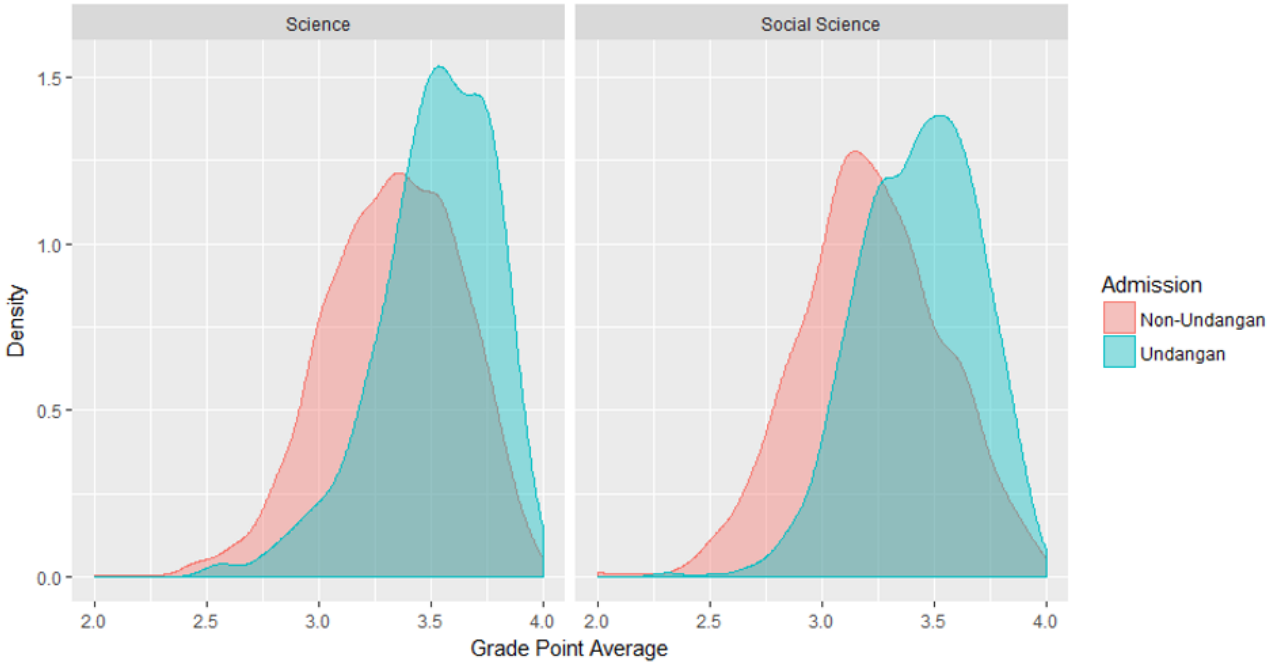

Figure 8. Grade Point Average Distribution between *Undangan* and non-*Undangan* Students by Gender and High School Major
Source: Calculated by the authors

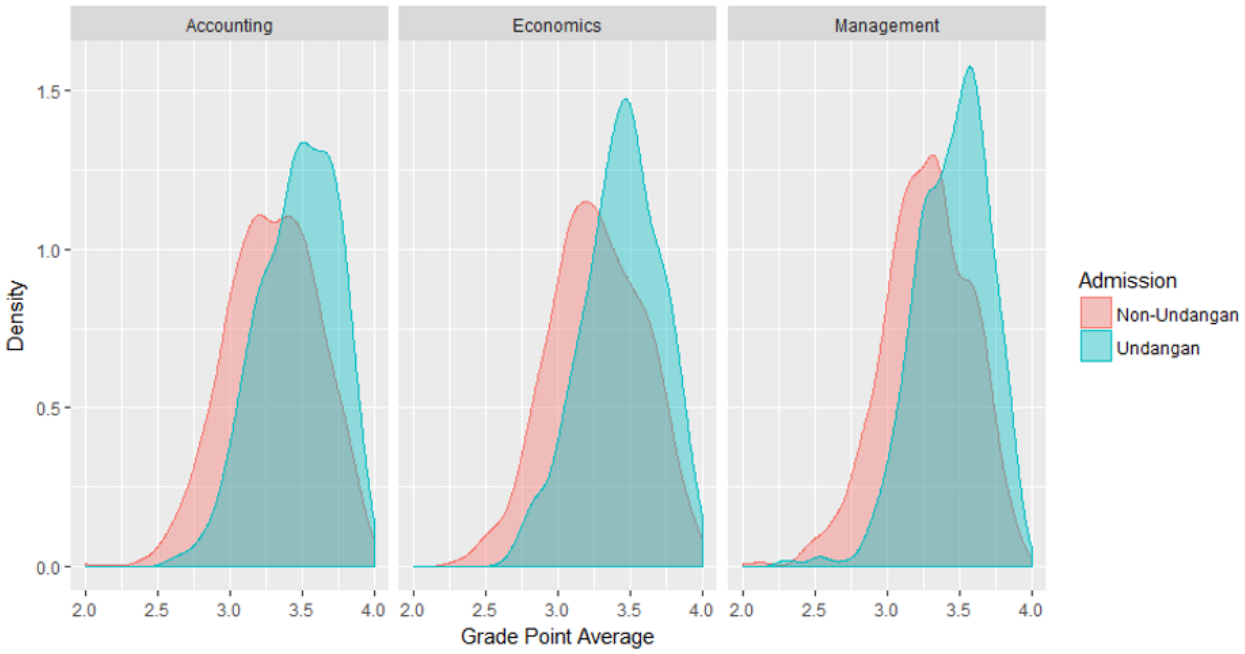

Figure 9. Grade Point Average Distribution between *Undangan* and non-*Undangan* Students by Departments
Source: Calculated by the authors

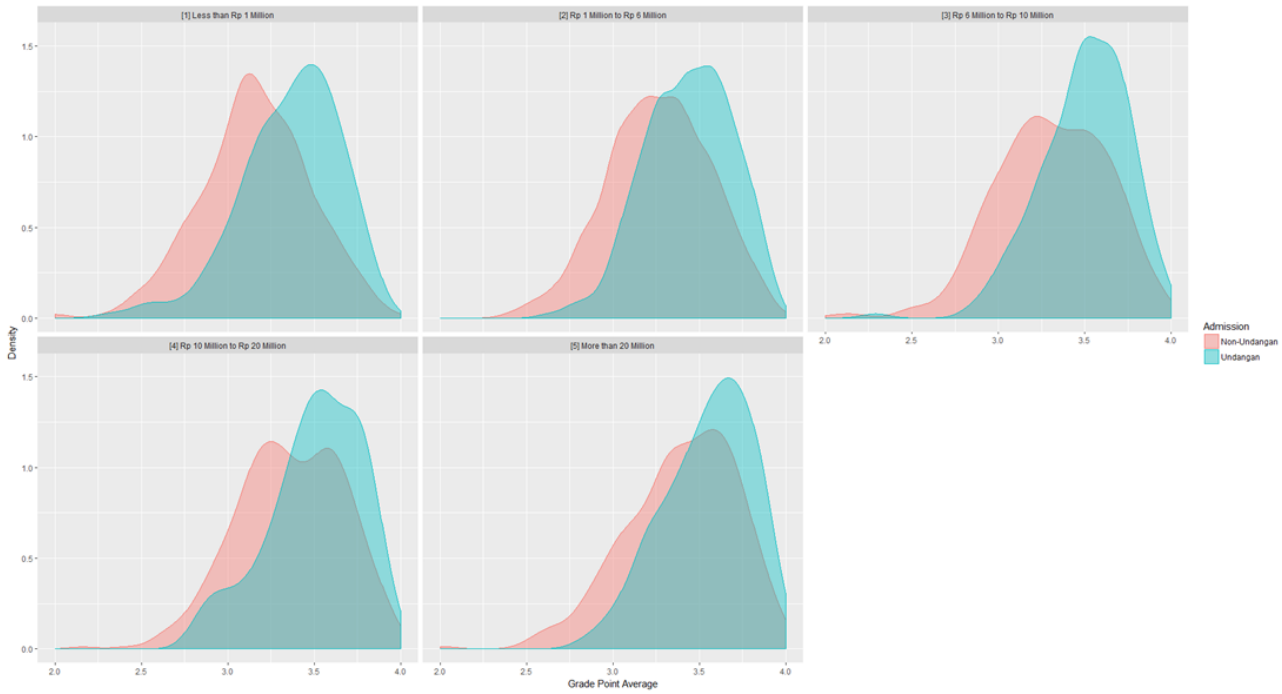

Figure 10. Grade Point Average Distribution between *Undangan* and non-*Undangan* Students by Parental Income Level
Source: Calculated by the authors

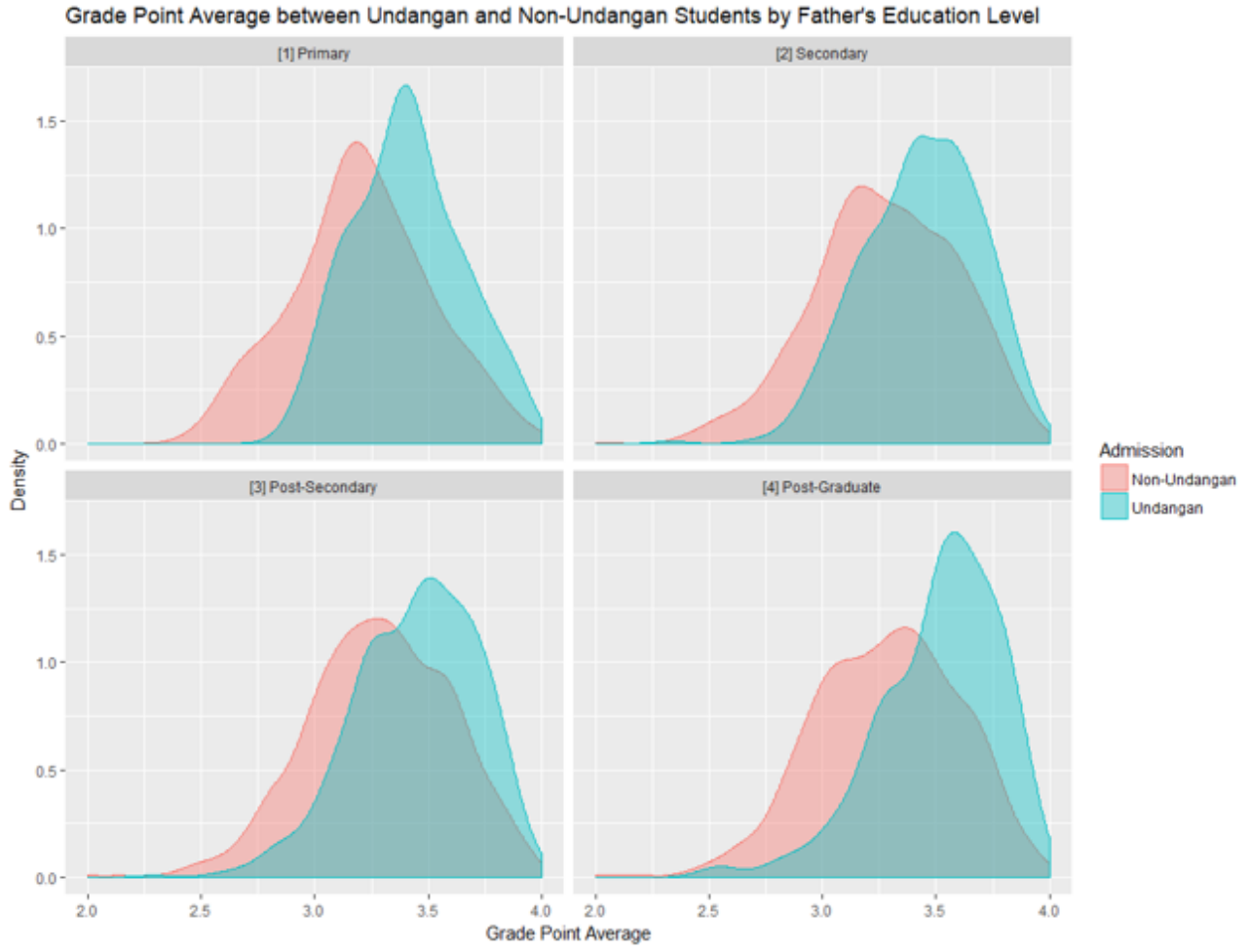

Figure 11. Grade Point Average Distribution between *Undangan* and non-*Undangan* Students by Parents' Educational Level
Source: Calculated by the authors

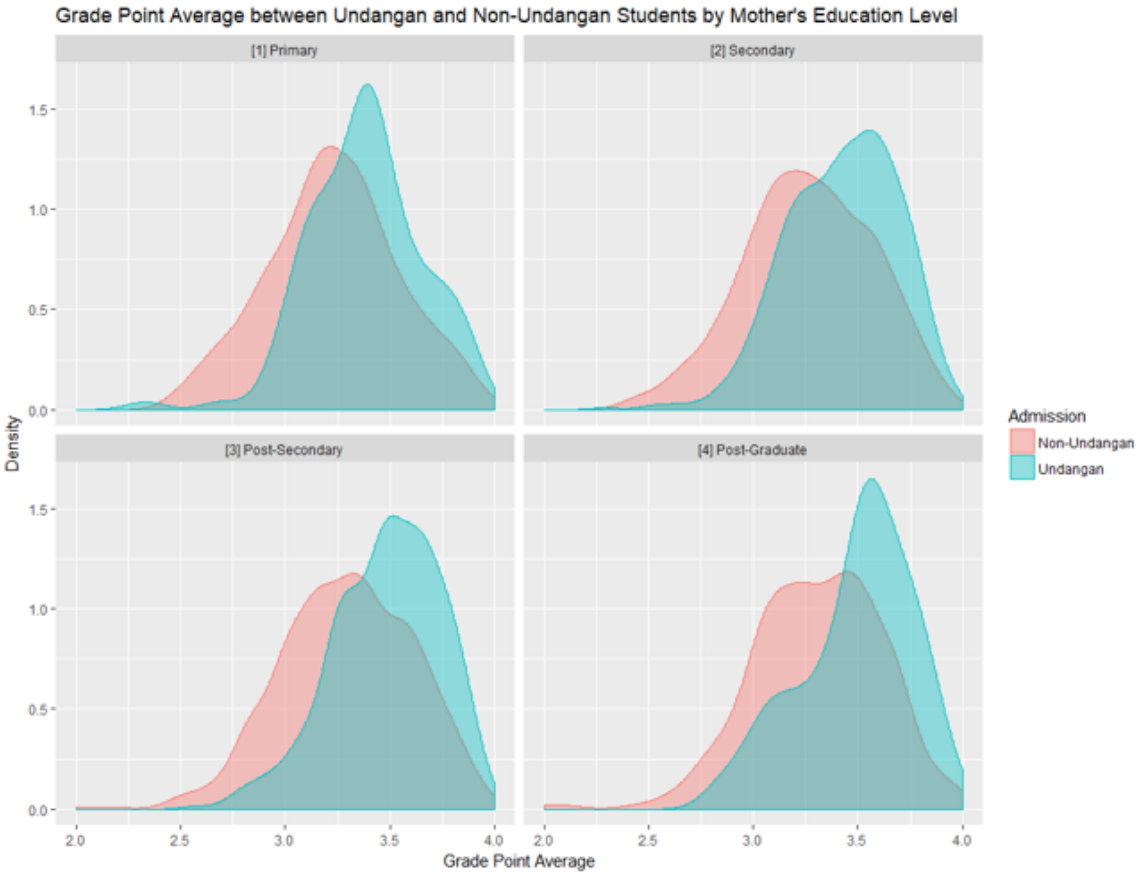

Figure 12. Grade Point Average Distribution between *Undangan* and non-*Undangan* Students by Parents' Educational Level
Source: Calculated by the authors

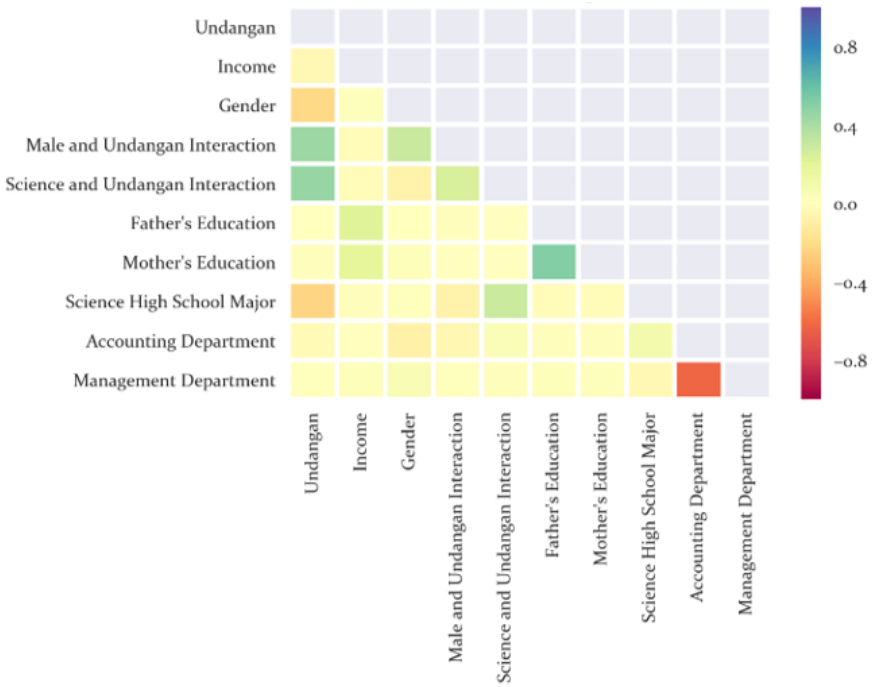

Figure 13. Correlation Matrix between the Independent Variables
Source: Calculated by the authors

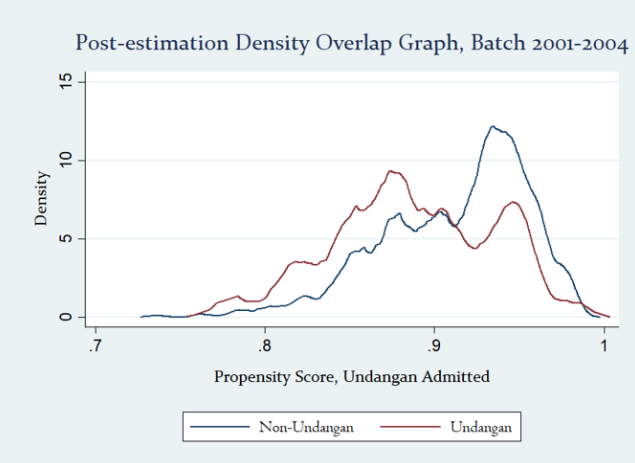

Figure 14. Grade Point Average Distribution between *Undangan* and non-*Undangan* Students by Gender and High School Major
Source: Calculated by the authors

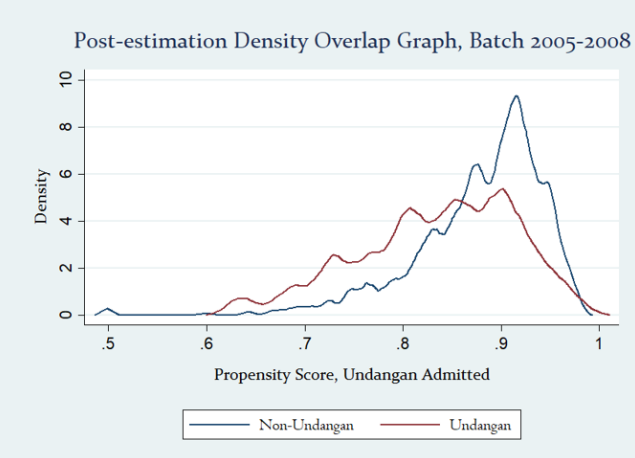

Figure 15. Grade Point Average Distribution between *Undangan* and non-*Undangan* Students by Gender and High School Major
Source: Calculated by the authors

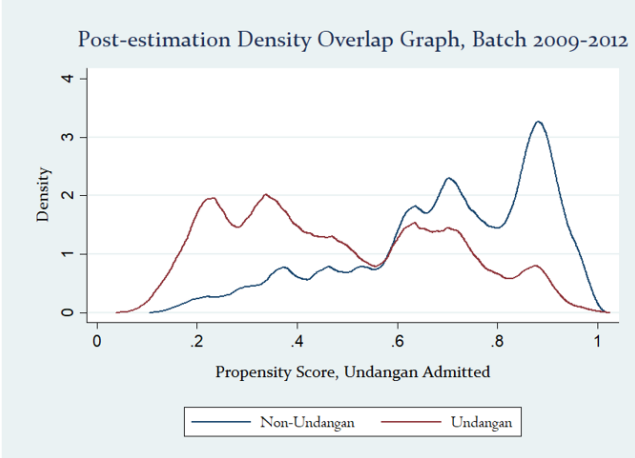

Figure 16. Grade Point Average Distribution between *Undangan* and non-*Undangan* Students by Gender and High School Major
Source: Calculated by the authors

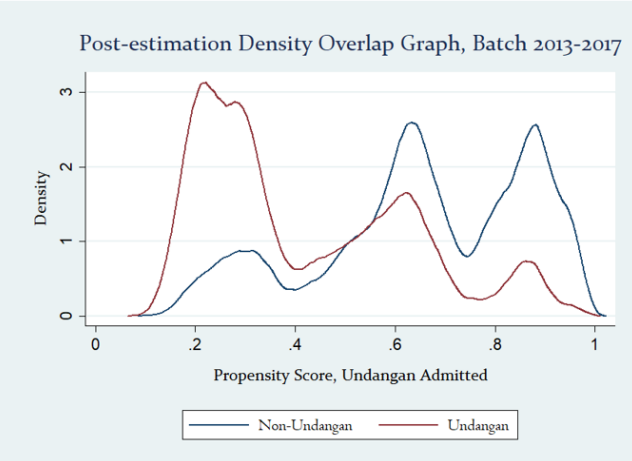

Figure 17. Grade Point Average Distribution between *Undangan* and non-*Undangan* Students by Gender and High School Major

Source: Calculated by the authors

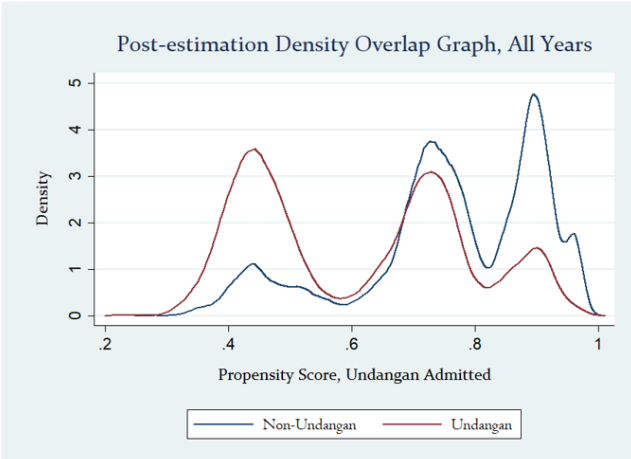

Figure 18. Grade Point Average Distribution between *Undangan* and non-*Undangan* Students by Gender and High School Major

Source: Calculated by the authors

Gedung LPEM FEB UI
Jl. Salemba Raya No. 4, Jakarta 10430
Phone : +62-21 3143177 ext. 621/623;
Fax : +62-21 3907235/31934310
Web : http://www.lpem.org/category/publikasi/workingppers/