# A Note on The Effect of Changing Domestic University Fees Under HECS.

[Draft]

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## 1 Introduction

In Australia, undergraduate domestic students are subsidised by the (Commonwealth) government and pay only part of their university fees. Under the *Higher Education Support Act 2003* (The Parliament of Australia, 2003), the government pays for their degrees upfront in full, but while part of this payment is a subsidy, the remainder is a loan that has to be paid back by students. This latter part is called "student contribution" and it is the amount that students will pay for their university degree. The student contribution is paid back via the Higher Education Contribution Scheme (HECS). Under this scheme, students will gradually pay the government back after they graduate and earn a sufficiently high income. Moreover, HECS is progressive so that graduates with higher incomes will pay the loan back at a higher rate. The Commonwealth government has the power to set the maximum student contribution that Australian universities can charge.

Each discipline is a assigned to one of three bands, which determined the maximum student contribution for that discipline. The *Higher Education Support Act 2003* (The Parliament of Australia, 2003) introduced a forth band, the "National Priorities". This band is assigned to those disciplines that the Commonwealth government is seeking to promote, including by reducing maximum student contributions. Between 2005-2009, *Nursing* and *Education* were declared national priorities. Between 2009-2012, all the Natural and Physical Sciences (which include Mathematical Sciences) were declared national priorities.

After 2009, when Nursing and Education were no longer considered a national priority, their maximum student contributions increased by approximately 25%, from \$4249 to \$5310. After 2012, when the Natural and Physical Sciences were no longer considered a national

priority, their maximum student contributions increased by approximately 85%, from $4520 to $8363.

The HECS system was design in order to make higher education financially accessible to every Australian. The government's upfront payment and the income-progressive way in which the government loan is paid back are features aimed at making students less concerned about the cost of their degrees. If the HECS system works, students should be relatively insensitive to changes in their student contribution. This further implies that under HECS the Australian Commonwealth government cannot effectively use the maximum student contribution as a policy instrument to boost demand for certain disciplines. In other words, under HECS, changing the student contribution to encourage or discourage enrolment in a certain discipline will not work.

In this note, I test whether the event of removing a discipline from the National Priority band – hence increasing its maximum student contribution – is associated which a change in the student enrolment for that discipline. The change in student enrolment is measured as an increase or decrease in the slope of the pre-event student enrolment trend. I find that moving a discipline from the National Priority band had no significant impact on student enrolment.

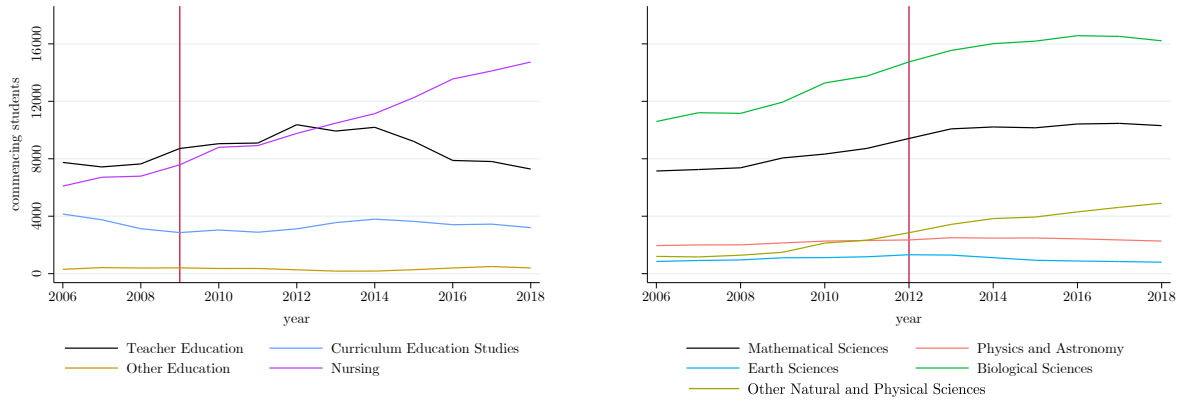
## 2 Data

I collected and combined publicly available data on commencing domestic undergraduate students and the Annual Course Contribution Value (ACCVAL) tables between 2004-2018. The ACCVAL tables provide information on maximum student contribution by discipline. Years 2004 and 2005 have been dropped from the analysis due to the way in which cross-institutional undergraduate students were categorised. This categorisation differs from the rest of the sample and creates uncertainty around the yearly number of commencing undergraduate students. The dataset and the R code to reproduce it[1] are available on my website (link).

## 3 Graphical analysis

Figure 1 shows the number of commencing students enrolled in a set of disciplines by year. This is the set of the disciplines that have been in the National Priority band at least once. Panel (a) shows the number of yearly commencing students in the National Priority band that started in 2005 and ended in 2009 - where year 2009 is marked by a red vertical line. The National Priority band between these years included disciplines related to Nursing and Education. Panel (b) shows the number of yearly commencing students in the National Priority band that started in 2009 and ended in 2012 – 2012 also being marked in red. The

[1] This includes automated download of all the data and their manipulation.




**(a) Nursing and Education** **(b) Physical and Natural Sciences**

**Figure 1. Termination of National Priority**

National Priority band during these years included all Physical and Natural Sciences and Mathematics.

An inspection of Figure 1 reveals that commencing students have not strongly reacted to the large changes in student contributions marked by the end of the National Priority programmes. In other words, the demand for those disciplines seems inelastic to changes in price. The only disciplines not displaying an uninterrupted linear trend is *Teacher Education*. The number of Teacher Education commencing students peaks in 2012, after which a decreasing trend starts. This change in trend occurs several years after the change in student contribution, hence the two are unlikely to be related.

## 4 Empirical framework

While commencing students data is available for all disciplines, the sample used for estimation does not include disciplines that were never in the National Priority band. Given this availability, an obvious candidate methodology is difference-in-differences (DID). However, the parallel trends assumption does not seem to hold when comparing the time series of the treatment and candidate control groups (not shown). Different discipline often display markedly different trends which – in absence of richer and more disaggregated data – will lead to biased estimates. Moreover, the "no spillover effects" assumption does not seem to hold either. This is because the control disciplines would be similar to the treated disciplines. Hence, a student might choose a control discipline instead of a treated discipline because of the cost increase in the latter.

Instead of a difference-indifferences, I choose an approach similar to an event study. I define the event as "being removed from the National Priority band". There are two instances of this event: one in 2009 and a second in 2012, as detailed above. I also restrict the sample to: (i) the ever-treated disciplines, i.e. the disciplines that were in the National

Priority band at least once; (ii) a time window spanning between 3 years before each event and 5 years after. The size of the window is determined by how many periods are available around both instances of the event. I use this sample to test whether, under HECS, drastically increasing the maximum student contribution for a discipline is followed by significant changes in enrolment trends in that discipline.

**Empirical specification**

To test this hypothesis, I estimate the following fixed effect equation for discipline $i$ and time $t$:

$$ln(Y_{i,t}) = \alpha_i + \beta_1 T_t + \beta_2 D_{i,t} + \delta D_{i,t} * T_t + \epsilon_{i,t} \quad (1)$$

where $ln(Y_{i,t})$ is the natural logarithm of the number of commencing students by discipline and year, $T_t$ is a yearly event time variable[2], $D_{i,t}$ takes value of one after the discipline is no longer in the National Priority band and zero otherwise and $D_{i,t} * T_t$ is their interaction term. The coefficient of interest is $\delta$, which can be interpreted as the yearly percentage change in enrolments following a sharp increase in student contribution.

**Results**

Column 1 in Table 1 shows the estimates for Equation 1. As anticipated by the graphical analysis, on average there is no significant change in the trend of enrolments after a sharp increase in student contribution ($\delta = 0.5$ with a p-value of 0.16). In Column 2, Equation 1 is estimated in the restricted case where $\beta_2 = 0$. In other words, in Column 2 the intercept is not allowed to vary after the event. Column 3 and 4 estimate the same equations as columns 1 and 2, respectively, but dropping the field "Other Education" from the sample. While the coefficient of interest is never significantly different from zero, Columns 3 and 4 show that "Other Education" is responsible for half of the size of the coefficient of interest, $\delta$. The leverage of "Other Education" is clear when inspecting Figure 2, which visualises the sample after trimming and centering the outcome variable, $ln(Y_{i,t})$.

## 5 Conclusion

These result are consistent with the hypothesis that HECS makes the demand for a discipline inelastic to changes in price. Even when facing a large increase in student contribution, the trend in new enrolments does not decrease on average. Therefore, HECS seems to be meeting its goal of allowing students to decide what they want to study independently of their financial situation.

At the same time, these results suggest that any policy aiming at incentivising particular careers via changes in the student contributions is unlikely to succeed. Hence the issue of increasing student contributions for a group of disciplines becomes normative. Given this

[2]An event time variable is a variable equal to the number of periods before/after the event. It takes negative values before the event, positive values after the event and it equal to zero in the year of the event.

**Table 1. Changes in enrolments after increase in student contribution**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Event time | 0.0523 | 0.0632* | 0.0496 | 0.0591 |
| | (2.03) | (2.27) | (1.72) | (1.92) |
| Contribution increase=1 | 0.0651** | | 0.0574** | |
| | (4.12) | | (3.73) | |
| Contribution increase=1 × Event time | -0.0616 | -0.0616 | -0.0363 | -0.0363 |
| | (-1.53) | (-1.54) | (-1.04) | (-1.05) |
| Constant | 8.206*** | 8.231*** | 8.446*** | 8.468*** |
| | (178.90) | (164.92) | (261.70) | (238.31) |
| Observations | 90 | 90 | 81 | 81 |

$t$ statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

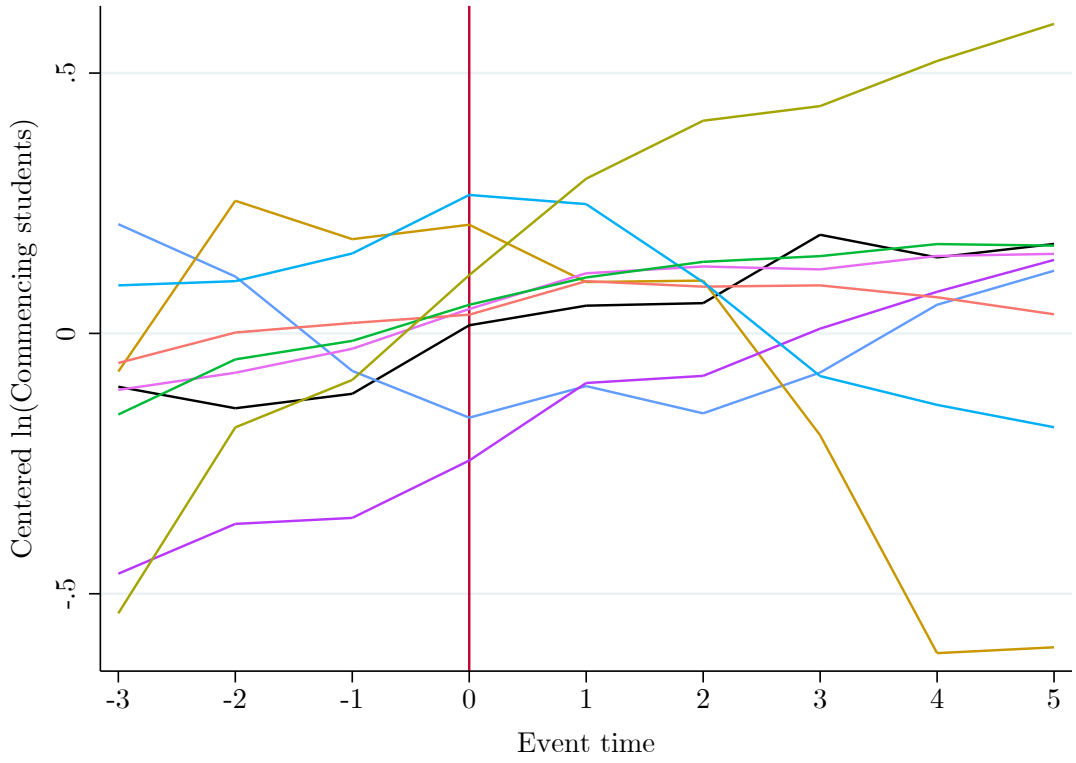
**Note.** Column 1 estimates of Equation 1. A linear model with discipline fixed effects is fit to data on the logarithm of yearly commencing students by discipline. The specification controls for a linear event time trend, which is interacted with the treatment dummy variable. A discipline is defined as treated after it is no longer in the National Priority band. Column 2 restricts Equation 1 to the case of no change in the intercept after the event (i.e. $\beta_2 = 0$). Columns 3 and 4 estimate the same equations as column 1 and 2 respectively but excluding "Other education". This is done in order to show how "Other education" alone doubles the size of the (negative) coefficient.

result, it follows that the government would have to justify on moral grounds rather than economic grounds any change in maximum student contribution targeting specific disciplines.

## References

The Parliament of Australia (2003). Higher education support act 2003. `https://www.legislation.gov.au/comlaw/Legislation/ActCompilation1.nsf/0/91FD9474C87B50A0CA256F85000DEF57/$file/HigherEducationSupport2003WD02.pdf`. [Cited on page 1.]

**Figure 2. Event window**




**Note.** This figure shows the centered log-transformation of commencing students by year and discipline. These disciplines that were all at least once in the National Priority band. Event time zero is the time at which the vent "being removed from the National Priority band" occurred. The colour coding is identical to Figure 1's, please refer to that legend.