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Access details: Access Details: [subscription number 929655569]

Publisher Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Education Economics

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713415403>

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First published on: 04 April 2011

To cite this Article Marangos, John(2011) 'The 'discouraged-business-major' hypothesis: policy implications', Education Economics,, First published on: 04 April 2011 (iFirst)

To link to this Article: DOI: 10.1080/09645292.2010.511820

URL: <http://dx.doi.org/10.1080/09645292.2010.511820>

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The ‘discouraged-business-major’ hypothesis: policy implications

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This paper uses a relatively large dataset of the stated academic major preferences of economics majors at a relatively large, not highly selective, public university in the USA to identify the ‘discouraged-business-majors’ (DBMs). The DBM hypothesis addresses the phenomenon where students who are screened out of the business curriculum often choose an economics major as their alternative. This paper explains how DBMs were identified as a subset of economics majors and then examines how the presence of DBMs affects the quality of students in the economics program. In addition, potential changes affecting the number of economics majors are investigated such as the economics department joining the business school, raising the minimum entry Grade Point Average (GPA), or raising calculus or introductory microeconomics course minimum grade requirements. The dataset was compiled from the transcripts of all economics majors who graduated between Spring 1999 and Spring 2005, that is 436 students over 19 terms. DBMs constituted 42% of economics majors and, on average, underperformed relative to non-DBMs academically. Of the policy changes considered, joining the business school would have the greatest impact, reducing the number of economics majors by 83%, but raising the average GPA of majors from 2.70 to 3.43. Requiring a B– or greater in introductory microeconomics would reduce majors by 32.8% and raise the GPA from 2.70 to 2.82.

Keywords: discouraged-business-major; economics enrollments

1. Introduction

Salemi and Eubanks (1996) devised the term ‘discouraged-business-major’ (DBM) as a hypothesis to explain the phenomenon where students who are screened out of the business curriculum often choose an economics major as their alternative. The creators of the term explained how the screening worked and how they identified those economics majors who were DBMs while using data from University of North Carolina (UNC) at Chapel Hill. They concluded that many of the changes in economics majors were caused by an increase, and subsequent decline, in the popularity of undergraduate business studies. They also reaffirmed empirically the argument that students consider an economics degree to be a substitute for a business degree. They found that increased demand for the business program resulted in an increase in the number of students not meeting the business school entrance requirements, and this generated an increase in the number of economics majors. Thus, the changes in the demand for the economics major mirrored the changes in demand for a business degree.

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The purpose of this paper is to further study the DBM hypothesis by determining the policy implications of this phenomenon. In particular, the paper examines the composition of the total number of economics majors over a specific period and divides the economics majors into a number of different categories and sub-categories centered around DBM students.¹ This project uses the transcripts from all economics majors who graduated between Spring 1999 and Spring 2005 from a relatively large, not highly selective, public university in the USA. The dataset encompassed 19 terms (one Fall, Spring, and Summer term per year) and 436 students. The study had the following three goals:

- (1) To determine the effect of the population of DBMs on overall performance of students in the economics department. The goal was designed to identify whether or not DBM students are able to cope with the demands of an economics degree.
- (2) To determine the effect of these DBMs on the composition of the body of economics majors. The goal was used to identify, using grades in the core economics courses, whether performance was related to DBM status.
- (3) To determine the policy implications of alternative scenarios of admission criteria established in the business school or the economics department. This goal was designed to identify the impact of lowering the entry requirements for business or raising the admission requirements of the economics department. This goal was achieved by using the number and quality, measured as average Grade Point Average (GPA), of economics majors.

Since the study provides alternative scenarios and discusses the consequences of screening applicants, economics departments would benefit from this research. An increase in economics majors, which can be attributed to the DBM hypothesis, reduces the average quality of students, as measured by the average GPA.² DBMs constituted 42% of economics majors and, on average, underperformed relative to non-DBMs academically. Of the policy changes considered by the economics department, joining the business school would have the greatest impact, reducing the number of economics majors by 83%, but raising the average GPA of majors from 2.70 to 3.43. Requiring a B– or greater in introductory microeconomics would reduce majors by 32.8% and raise the GPA from 2.70 to 2.82. The results and policy implications of the study are of interest to economists because they question the pedagogy of the dominant curriculum structure of economics courses and the employability argument advanced by most economists adhering to the teachings of a specific economics perspective.

The paper is structured as follows: Section 2 offers a literature review, establishing the DBM hypothesis and the substitutability between economics and business degrees; Section 3 describes the method and source of data; Section 4 presents the results and analysis; Section 5 reveals the policy implications; and Section 6 concludes.

2. Literature review: the discouraged-business-major hypothesis

Siegfried and Raymond (1984, 21) established the main reasons students major in economics were: interest in the subject, improved prospects for employment, practical knowledge for decision-making, and preparation for professional school. A more recent survey by Jones et al. (2008) generally corroborates these early results

since 52.1% of students became economics majors because of the following reasons: 'I did well in early courses and found it interesting,' followed by 'Intellectually, it was the most exciting major,' 'It was a major with a nice combination of analytic rigor and policy,' 'It was the major that offers the best job opportunities after graduation,' and finally 25.5% of students stated: 'It was the major that was closest to a business major.' Ever since Siegfried and Raymond (1984) noted these reasons, economics departments have attempted to effect these factors as a means of inducing changes in enrollments in a positive direction. However, enrollment in economics, in addition to the aforementioned reasons, can fluctuate due to the DBM hypothesis.

The DBM hypothesis is directly linked with the timing of choosing a major since not all students decide to major in economics at the same stage of their education career. Twelve percent reported that they had decided to major in economics before arriving at college; 19% decided in their freshman year (first year); 46% in their sophomore year (second year); 20% in their junior year (third year); and 3% in their senior year (fourth year) (Siegfried and Raymond 1984, 21). The timing of choosing a major in economics has important consequences with regard to enrollments because students may experiment with other majors or they may be rejected by their major of choice and thus be content with a second-best choice.

Salemi and Eubanks (1996, 350) developed the concept of a DBM as a hypothesis to explain the substantial rise and fall in the number of economics majors. This rise and fall is a consequence of the aforementioned reasons and the timing involved in the decision to major in economics. Students who were refused by the business school often chose an economics major as their second choice. This is because students regard economics a close substitute for business (Brasfield et al. 1996; Salemi and Eubanks 1996, 353; Siegfried and Wilkinson 1982). In particular, Siegfried and Wilkinson (1982, 137) found that the number of undergraduates majoring in economics was significantly lower at institutions that offer a business major. Thus, students will also be attracted to a particular university by the presence of business majors, believing they will major in business, and only becoming economics majors after they become 'discouraged.' Consequently, there are two impacts that result from the presence of a business major on an economics department. The first impact is that students shift to economics once they do not satisfy the entry requirements for business, and the second impact is that the preference for universities that offer a business major gives the 'opportunity' to students to become 'discouraged' and as a result to enroll in the economics program. In contrast, universities with no business majors cannot take advantage from either the increased demand for universities with business schools or the DBM hypothesis. Thus, the presence of business major at the university is a win-win situation for economics.

Brasfield et al. (1996, 363) further examined the relationship between business studies and economics. Because of the business spillover, they argue, economics departments located at schools offering business degrees may benefit in terms of majors. Brasfield et al. (1996) used the year 1989–1990 as the base year for their study because the national reduction in economics majors in the USA occurred after this date. They concluded that schools lacking an undergraduate business degree option were more likely to lose economics majors. Thus, the decline in economics degrees may be attributable to the decline in the popularity of business degrees. Economics departments in schools that did not offer the business degree were not only more at risk to have experienced decreasing majors, but they also accounted for a disproportionate

share of the overall decline. The offering of the business degree seemed to be the key determinant of majors in economics, not the administrative location of the economics department (Brasfield et al. 1996, 366).

Siegfried and Wilkinson (1982) examined the influence of certain factors on students' choice of major. Apparently, only one major curriculum factor affects the number of students who major in economics: if there is an undergraduate business administration degree available at the same institution the number of economics majors declines drastically (Siegfried and Raymond 1984, 21). Lewis and Norris (1997) reported a survey of Australian economics department heads regarding the possible causes of the decline in economics majors. They concluded that there is a general perception among students that the study of economics is regarded less favorably compared to business studies. Additionally, Worthington and Higgins (2004, 609) state that perceptions and interest would be much closer between an accounting and economics major than that between economics and non-business-related disciplines, such as in the humanities or physical sciences.

Willis and Pieper (1996) also link the decline in economics majors with the changes in the popularity of undergraduate business studies. They found that schools offering undergraduate business degrees have only one-quarter as many economics majors as schools that do not. The offering of a business economics major within the school further lowers the number of economics majors by one-half. In sum, the decline in economics majors is attributed to a change in popularity in favor of undergraduate business studies. Thus, all the aforementioned studies reveal a negative relationship between the enrollments in economics and business majors.

However, due to the DBM hypothesis an increase in the popularity of business studies may result in an increase in economics majors. When students are screened out of business, they select an economics major as their second-best choice since they perceive economics and business as substitutes. Salemi and Eubanks (1996, 359) reported that on average between 1983 and 1994, DBMs accounted for 69 of the annual total of 203 economics degrees (or 33.99%) at the UNC at Chapel Hill. The share rose between 1984 and 1990 and fell between 1990 and 1993, indicating that DBMs accounted disproportionately for the economics-degree cycle at UNC. DBMs and OEMs (other economics majors) have different characteristics: DBMs have lower SAT scores, lower college GPAs, and lower grades in principles of economics and intermediate microeconomics. Salemi and Eubanks (1996) confirm the general finding that students consider an economics degree to be a substitute for a business degree. A change in the popularity of business studies is thus likely to have a greater impact on economics than on other programs. Because enrollments can be attributed to changes in students' preferences for business studies, economics departments should consider this factor in future planning.

In sum, for schools with business programs, there are two empirical findings: first that the presence of an undergraduate business degree reduces the number of economics majors, *ceteris paribus*, and second, that an increase in demand for business may increase demand for the economics degree where business students are screened. These two observations can operate simultaneously. Potential implications of the DBM phenomenon for economics departments include, as Salemi and Eubanks explained, an academically weaker student body (as measured by college GPA and test scores) as well as potentially ill-suited students who have chosen economics not from aptitude or preference but because they believe employers will consider it a close substitute for a business degree.

3. Methods and source of data

The first step in this study was to compile a dataset that could be used to assess the validity of the DBM hypothesis and to evaluate the potential implications of this phenomenon. Students at the university under study who do not meet business school admission criteria upon entrance to the university are not allowed to declare a major in business. These students are encouraged to declare their major as 'open-option seeking business' (OOSB), while they put more effort to meet those criteria for future business school admittance. For our purposes the declaration of OOSB will be taken as a stated intention to major in business.

It was necessary to ascertain two things: whether or not an unusual number of OOSB students were later declaring economics as their major, and whether or not these students were *less* likely to meet the business school admission criteria compared with students from other disciplines who later declared economics as their major. The dataset is compiled using the transcripts from all economics majors graduating between Spring 1999 and Spring 2005, a total of 436 students over 19 terms at the university under study. For each student the following data were recorded:

- the student's initial major prior to declaring economics as their major;
- the student's GPA at the time of declaration;
- the student's number of transfer credits from other institutions;
- the number of credits the student had taken before declaration;
- the student's individual course grades in each of the 'core' economics courses (ECC202 Principles of Microeconomics, ECC204 Principles of Macroeconomics, EC304 Intermediate Macroeconomics, and EC306 Intermediate Microeconomics) as well as an introductory calculus course (M141 or M160-161);³
- the student's GPA after declaration;
- the student's total number of credits upon graduation; and
- the student's GPA upon graduation.

The requirements for acceptance to the business school are as follows: a minimum of a 3.0 GPA at the time of acceptance, a minimum of a B- (2.66 GPA) in principles of microeconomics and in calculus for business majors. The economics department, meanwhile, does not have particular requirements above and beyond the university requirement of a 2.0 overall GPA at the time of acceptance and a minimum of a C- in principles of microeconomics. The category of DBM was constructed by grouping all students whose major prior to declaration of 'economics' was OOSB (which indicated an intent to major in business), and who also did not meet one or more of the criteria for admittance to the business school at the time they declared their economics major. Table 1 reveals the percentage of economics graduates by initial major, 45.41% consist of OOSB students, and the percentage of economics majors by initial major who would have met the business school entry requirements.

4. Results and analysis

4.1. Identifying the discouraged-business-major students

Given that degrees in economics and business are seen as close substitutes, based on the aforementioned literature review, our first task was to examine whether or not the stringent admission criteria for the business school has created a body of DBMs in the

Table 1. Percentage of economics graduates by initial major.

Initial major	No. of graduates in entire sample	Percentage of total economics graduates	Meeting criteria of business school (% per entry) Able students
OOSB	198	45.41	17 (8.58)
Open option	90	20.64	11 (12.22)
Math, science, and engineering	56	12.84	10 (17.86)
Other majors	48	11.01	12 (25.00)
Economics	44	10.09	24 (54.55)
Total	436	100	74 (16.97)
DBM (OOSB – not-able)	181	41.51	0 (0.00)

economics department. To this end, we have created the category ‘DBM’ to describe any student:

- classified an OOSB major immediately prior to their declaration of an economics major; and
- unable to meet the business school admission criteria by (1) receiving a grade below B– in either introductory calculus course or in principles of microeconomics, or (2) failing to maintain an overall GPA of 3.0.

Because the data sample includes only the students’ major when they switched into the economics department, we do not have information about previous majors they may have declared and changed. For this reason, it is likely that DBM slightly underestimates the true number of DBMs in the economics department; many may have first changed from ‘open option seeking business’ to ‘open option’ or other majors and only later into economics. In our sample from 1999 to 2005, we find that DBMs make up approximately 41.51% (181 out of 436) of the total number of economics graduates (see Table 1). The likelihood that DBMs find their way to economics is not new or surprising, but the magnitude of this phenomenon at the university under study is striking.

Furthermore, we find that ‘OOSB’ students are less likely to have met the criteria for business school admissions than students from any other of our major categories: ‘open option,’ ‘math, science, and engineering,’ ‘other,’ and ‘economics’ (see Table 1). Students who are considered to have the initial major ‘economics’ are those who declared economics as their major immediately upon admission to the university under study, and they are primarily transfer students. ‘Able’ refers to those students who are able to meet the business school admission criteria; ‘not-able’ refers to those students who are not able to meet the business school admissions criteria (see Table 1).

Based on our calculations, 54.1% DBMs received a grade below B– in principles of microeconomics and 56.9% in calculus course. Since 45.3% DBMs who failed to reach a B– in principles of microeconomics also had an overall GPA of less than 3.0, we can see that it is not solely principles of microeconomics in which these students are unable to perform well. At the time at which they declared economics to be their major, all but 4 of the 181 DBMs (2.2%) in the sample failed to meet the admission requirement of a 3.0 overall GPA. Thus, this particular requirement, a 3.0 overall GPA, is more stringent than the requirement of a B– in principles of microeconomics or in the calculus for business majors.

4.2. Identifying the enhanced performance students

Our second task is to determine the effect of this population of DBMs on overall performance by students in the economics department. In order to answer the question of ‘fit,’ whether or not DBM students are appropriate for the economics department, we have created another category: ‘enhanced performance students’ (EPS). This is defined as all students who either have a:

- GPA in courses taken after joining the economics department (when they will take the bulk of their economics coursework); or
- GPA after joining which is better than their GPA before they joined.

Using this index, we can analyze whether or not DBMs are likely to be ‘appropriate for economics studies.’ We find that DBMs are more likely to be ‘inappropriate’ than non-DBMs at 31.8% and 20.7%, respectively. In other words, DBMs are more likely to be non-EPS.

One might suppose since DBMs generally had a GPA below 3.0 before declaring economics as their major (thus *not meeting the business school admission criteria*) that this ‘appropriateness’ index might be biased against them. There would undoubtedly be a segment of non-DBMs who had a GPA above 3.0 after declaring economics as their major, but for whom this represented a decline from their GPA *before* declaring economics as their major. However, on closer examination, this proves not to be the case. Despite generally not having a GPA of 3.0 before declaring economics as their major, DBMs are more than twice as likely than non-DBMs to have a GPA of 3.0 after declaring economics as their major, at 65.3% and 29.8%, respectively. Though non-DBMs are much more likely to improve their GPAs, they are much less likely to manage a 3.0.

Despite this, however, the *average* GPA for DBMs, 2.64 after declaring economics as their major, is still lower than that for non-DBMs. The non-DBM not-able students’ average GPA was 2.80 and that for able students was 3.42 (see Table 2). Even when the DBMs are divided into subsets of those who met the EPS and non-EPS, EPS DBMs had lower post-declaration GPA of 2.81 than EPS (2.97) and EPS non-DBM (3.08). In addition, non-EPS DBM had lower post-declaration GPA (2.29) than non-EPS (2.35) and non-EPS non-DBM (2.41).

The very low GPAs must be driven by that third of the DBM group (31.8%), which is considered ‘inappropriate’ for economics, performs far worse academically than the lowest third of the non-DBM group. Note that almost all DBMs who improved their GPAs did so by a large enough margin to surpass the 3.0 threshold. Students who have a post-declaration GPA – which is better than their pre-declaration GPA, but *not* a post-declaration GPA of 3.0 or better – represented only 5% of total DBMs. In contrast, this group makes up 49.5% of the total non-DBMs in the sample.

Why might this be the case? It is likely that those DBMs who strive to improve their GPA to 3.0+ after declaring economics as their major are not yet thoroughly discouraged; they may be driven by the carrot of potential admission to the business school, should they at some point raise their cumulative GPA to 3.0. Non-DBMs are not likely to have such a stimulus. They might, therefore, be willing to settle for lower grades than DBMs, even though they have higher average grades and are more likely to see their GPA increase, but not to 3.0 GPA. Those DBMs who are not able to improve their GPA after declaring economics to be their major may be thoroughly

Table 2. Final GPA, post-declaration GPA and average grades in economics courses per category.

Category	Final GPA	Post-declaration GPA	Average grade in principles of microeconomics	Average grade in principles of macroeconomics	Average grade in intermediate microeconomics	Average grade in intermediate macroeconomics	Average grade in introductory calculus
DBM	2.52	2.64	2.59	2.51	2.51	2.35	2.30
Non-DBM not-able	2.68	2.80	2.85	2.76	2.77	2.72	2.59
Able	3.43	3.42	3.70	3.50	3.50	3.41	3.57
EPS	2.8	2.97	2.89	2.78	2.93	2.79	2.70
EPS DBM	2.58	2.81	2.60	2.50	2.67	2.45	2.41
EPS non-DBM	2.94	3.08	3.07	2.95	3.10	3.01	2.88
Non-EPS	2.45	2.35	2.71	2.63	2.26	2.25	2.28
Non-EPS DBM	2.41	2.29	2.58	2.51	2.18	2.15	2.08
Non-EPS non-DBM	2.5	2.41	2.84	2.75	2.32	2.35	2.48

Note: The numbers represent average grades for students in each category in each of the core courses of the economics major and introductory calculus course. 'DBM' refers to 'discouraged business majors'; 'non-DBM' refers to all other students. 'Able' refers to those students who are able to meet the business school admission criteria; 'not-able' refers to all other students. 'Enhanced performance students' (EPS) represents all economics graduates who meet the criteria and whose core economics course grades did not decline from the 'principles' level to the intermediate level; 'Non-EPS' represents those economics graduates who have failed to meet this criteria. Figures have been rounded up to two decimals for display.

discouraged or may simply be poor students. Thus, students who wish to major in business but fail to meet the criteria fall into one of two sharply divided groups: one group that still strives for business school admission and the other group that has apparently ceased to do so.

4.3. Performance of DBM students

The next question we must ask is: what effect these DBMs have on the composition of the body of economics majors? Are grades in the core economics courses related to DBM status or to the status 'appropriate for economics'? If so, to what degree? From Table 2, we find that DBMs have lower average grades than non-DBMs not-able and able students in every core economics course.⁴ In principles of microeconomics DBMs have an average GPA of 2.59, while non-DBMs not-able 2.85 and able 3.70. In principles of macroeconomics the averages were 2.51, 2.76, and 3.50, respectively. In intermediate microeconomics the averages were 2.51, 2.77, and 3.50. In intermediate macroeconomics the averages were 2.35, 2.72, and 3.41, and in introductory calculus the averages were 2.30, 2.59, and 3.57. Even when the DBMs are divided into subsets of those who met the EPS and non-EPS, EPS DBMs had worse average grades in each core economics course than EPS and non-EPS DBMs. In addition, non-EPS DBMs had worse average grades in each core economics course than non-EPS and non-EPS non-DBMs. Hence, DBM students always underperform in comparison to non-DBM students independently of EPS status.

We know from the data, measured by the 3.0 post-declaration GPA threshold, that a solid majority of DBMs do well in their academic careers after declaring economics as their major. But despite the fact that many DBMs are intensely driven to succeed, they nonetheless struggle with basic economics concepts and models. This drives down average educational achievement among economics majors and hinders DBMs in their attempt to switch from the economics major to the business school.

A fundamental question raised by this data is: 'why do DBMs fail to excel in economics?' given that the majority of DBMs do well overall. Why do these students receive such poor grades in intermediate-level core economics courses and good grades in other courses? It does not appear to be the case that these students are discouraged in a literal sense, though it is clearly the case that they represent 'rejected business students.' We cannot say what it is that makes these different groups behave differently. We have come to the conclusion that EPS could either signify students who had some natural talent for or interest in economics relative to other subjects, or students who were more motivated than others.

The impression from the data is that non-DBM EPS students fell into that category because (at least in part) of their interest in economics, indicated by their performance in intermediate-level economics courses. DBM EPS students do not fit that pattern. They have good grades after declaring economics as their major despite an apparent lack of an interest in economics. Our best guess, though again it is purely conjecture, is that these students do well because they are focused on reaching a 3.0 overall GPA in order to change their major to business. However, why they struggle in economics in particular is an open question. It could be that they load their schedules up with 'easy' courses with the specific goal of raising their GPAs. It might also be related to their poor calculus grades, or it could be something entirely different. In this case, the literature provides some findings to better understand the factors affecting students' performance in economics courses. The literature finds the following

factors important: the overall achievement level in high school; taking a calculus course as a high school senior; background knowledge of economics; race, gender and nationality; personality type; and class characteristics (Anderson and Dwayne 1994; Borg and Shapiro 1996; Borg and Stranahan 2002; Kherfi 2008; Swope and Schmitt 2006).

4.4. *Enhanced performance students versus non-enhanced performance students*

This issue does not disappear if we divide students into both EPS and non-EPS categories. While the validity of the EPS classification holds (in that non-EPS economics majors show a significant decline in performance from the principles to the intermediate-level core courses, while EPS economics majors do not), this correlation does not hold so closely with respect to core course GPA and total GPA (demonstrated in Table 3). Table 3 provides useful information regarding the overall grades per category of economics students. For example, EPS DBMs – who are much more likely to have a post-economics major GPA of at least 3.0 or to have increased their GPA – have lower grades in intermediate macroeconomics and intermediate microeconomics than EPS non-DBM students. While the average EPS DBM maintained a 2.81 GPA after declaring the economics major, the average for intermediate-level core economics courses was only a 2.56. EPS non-DBMs, on the other hand, maintained an average GPA of 3.08 after declaring the economics major, with an average of 3.03 in intermediate-level core economics courses. In addition, grades for non-EPS DBMs are exceptionally low in all core courses, with average grades only very slightly above the level required to pass.

It seems that whether DBMs do well or not after declaring the economics major, their grades in economics courses, or at very least their grades in core economics courses, are on average having a detrimental effect on their GPAs. It is noteworthy that this phenomenon is not seen in the sample of non-DBM economics majors, both EPS and non-EPS. However, this also suggests that business-minded students still struggle in economics, despite the incentive effect. This may be due to the different skill requirement and different approach to issues in economics and business; economics requires more mathematics and abstract thought.

The high post-declaration GPAs among EPS DBMs, who we may classify as ‘driven,’ appear to come from grades in non-economics courses or, at the very least, non-core economics courses. On average, students declare their economics major three semesters after they begin their undergraduate studies. Since most university prerequisites are taken before the economics major is declared, students have a high degree of personal freedom in selecting which non-economics courses to take after declaration. Therefore, another explanation might be that ‘driven’ DBMs are able to select ‘easy’ courses when choosing electives but not for courses required by their major. Another intriguing possibility worthy of future discussion is that upper-level economics electives, generally taken post-declaration, often involve more policy and applied economics and less in the way of abstract theory and formulae, which many economics students find difficult.

5. Policy implications

In closing, we are also able to make an estimate of the effect that alternative admission criteria between the business school and the economics department would have on the

Table 3. Overall grades per category.

Category	Micro change in %	Macro change in %	Economics core average	Economics core/GPA ratio in %	Intermediate courses/GPA in %
DBM	-3.32	-6.70	2.49	-1.67	-7.82
Able	-5.33	-2.71	3.53	3.14	1.00
Non-DBM not-able	-2.85	-1.48	2.77	3.35	-2.08
EPS	1.55	0.56	2.85	1.69	-3.75
EPS DBM	2.47	-2.22	2.56	-1.48	-8.82
EPS non-DBM	1.11	2.01	3.03	3.51	-0.78
Non-EPS	-16.82	-16.89	2.46	0.41	-4.30
Non-EPS DBM	-15.21	-16.58	2.36	-2.24	-5.47
Non-EPS non-DBM	-18.26	-17.17	2.57	2.93	-3.20

Note: Micro change refers to the change in average grades from principles of microeconomics to intermediate microeconomics. Macro change refers to the change in average grades from principles of macroeconomics to intermediate macroeconomics. Final GPA is their GPA as of graduation. Economics core GPA is EC202, EC204, EC304, and EC306 (principles and intermediate). Economics core/GPA, the ratio, is $\frac{[\text{Economics core} - \text{Final GPA}]}{[\text{Final GPA}]} \times 100$. Post-declaration GPA is the students' GPA counting only credits taken after the semester in which they officially declared economics as their major. Intermediate/GPA is the average of 304 and 306 minus Post-declaration GPA (POSTDEC) divided by $\frac{(\text{POSTDEC})}{(\text{POSTDEC} + \text{POSTDEC})} \times 100$. Some figures have been rounded up to two decimals for display.

makeup of the economics department. Given the prevalence of DBMs within the university under study, we conduct a number of ‘what ifs?’ to determine the implications for the size of the economics major, if alternative entrance requirements were implemented by lowering the standards for business or increasing the standards for economics.⁵ The goal is to examine reasonable policy changes that an economics department might pursue to reduce the number of majors, if desired, or increase the quality of students majoring in economics. While the analysis is somewhat oversimplified, the quantitative messages are interesting. An economics department that coexists with a business school can respond to the DBM phenomenon with policies that will have a wide range of incremental effects.

Assuming that all DBMs would major in business if they met the business school admission criteria, in the following alternative scenarios of lowering the entry requirements for business are presented. We find that if the business school were to only lower its cut-off for principles of microeconomics to the 2.0 (C) level required by the economics department, there would be no change in the number of economics students. This is because every single DBM who received less than a B– in principles of microeconomics also had a pre-declaration GPA of less than 3.0. If the business school waived the calculus requirement, the economics department would only lose 1.15% of the majors. There would also be a small increase in the average GPA from 2.70 to 2.71 (0.37%). If the business school were to remove the 3.0 GPA requirement the number of economics graduates would decrease by 11.47%, resulting in only a very small increase in average GPA in the economics department from 2.70 to 2.72 (0.74%). If the business school were to lower its admission criteria to the overall university level, the number of economics graduates would decrease by 41.74%, though this would raise the average GPA of economics graduates from 2.70 to 2.82 (4.44%).

On the other side of the coin, if the economics department was able to raise their own admission requirements the following alternative scenarios are presented.⁶ If the economics department required a B– in principles of microeconomics, this would decrease the number of economics graduates by 32.8% and raise the average GPA from 2.70 to 2.82 (4.44%). If the economics department required an introductory calculus course grade of B–, then majors would be reduced by 47.94%, and the average GPA would increase from 2.70 to 2.86 (5.93%). If the economics department required a 3.0 GPA to declare economics as a major, there would be a reduction of 75.86%, and the average GPA would increase from 2.70 to 3.39 (25.56%). If economics requirements were raised to the level of the business school, the number of economics graduates would decrease by 83% and the average GPA would increase from 2.70 to 3.43 (27.04%).

The policy changes involving decisions made by the economics department as opposed to the business school are more interesting and realistic, as this would entail shifting underperforming economics majors (both DBMs and non-DBMs) to other non-business majors, while the policy changes from the business school would entail lowering their standards and ‘re-acquiring’ less-able students, primarily from economics. There are important differences between the two groups of policy changes (business school changes versus economics department changes) on the number of economics majors and where students are going. This is a very important point as economics departments make policy and curriculum changes.

It is not clear where the ‘economics’ students will go if the entry requirements for economics were raised, as both their first and second preferences – business and

economics – were not attained. We do not have any data about which other majors are considered to be ‘substitutes’ for business and economics or about the ranked preferences of particular students. In all likelihood, they will be only accepted to programs with lower entry standards such as agricultural sciences, applied human sciences, liberal arts, natural sciences, and natural resources, rather than programs that have more competitive admission requirements, including a higher GPA, higher test score, and/or additional course work such as art, biomedical sciences, computer science, engineering, technical journalism. These are estimates under the *ceteris paribus* assumption. Some students might respond to the higher required grade by putting more effort into the course; therefore, the estimates are likely to overstate the decline in the number of economics graduates associated with stricter requirements.

The presence of an economics department in liberal arts schools has consequences on the teaching style and methodology since the empirical results strongly indicate that the administrative location of an economics department in business versus liberal arts schools significantly changes the character of the program offered to majors because there are significant differences in the respective economics curricula (Dean and Dolan 2001, 18–19). Consequently, this paper clearly reaffirms the Salemi and Eubanks (1996, 360) argument that economics departments in liberal arts schools should realize that they serve two different client groups and they should consider whether their curriculum meets the needs of both. The differences in personality type of these two groups of students may therefore mean that some of the instructional techniques used in economics education may not appeal to all students (Worthington and Higgins 2004, 609). It appears to Salemi and Siegfried (1999, 359–60) that an efficient use of educational resources will require a reallocation toward teaching economics as general rather than specialized education.

The important implication of these findings for economics departments similar to the university under study is pretty pessimistic from a faculty perspective. Economists who enjoy teaching should get used to a large percentage of less-able and less-motivated DBMs. This is understandably demoralizing to economists who enjoy teaching the important, and probably more difficult, concepts upon which economic thinking relies. Over time, this circumstance could easily lead to an attitude of futility among faculty, especially at a larger school with large classes. If so, the easy path is to minimize teaching and focus almost exclusively on research. Moreover, this is especially rational since one’s professional advancement and mobility is more closely tied to research than teaching.

As the policy implications reveal, an alternative strategy is to screen out DBMs. But this is a very slippery slope since faculty lines typically follow student enrollment. In short, the finding of 42% DBMs suggests that the economics department gains resources due to the share of DBMs, but does not gain a lot of fulfillment. This is not a happy situation for faculty or students. Perhaps economics department in this position should consider offering a ‘business economics’ major in addition to a more liberal arts oriented major (i.e. there can be clear differences in core classes and electives). Brasfield et al. (1996) reasoned that flexibility in economics electives appeared to have a positive impact on the attractiveness of economics as a major. It would permit some distillation in coverage for both the non-DBM and DBM cohorts. It could also create some more gratifying enclaves in the curriculum for faculty. This policy should be considered if the economics department is largely afflicted by DBMs.

The economics department at the university under study, which is a relatively large public university that is not highly selective, has weaker acceptance requirements than the business school, thus allowing lower ability students to major in economics. There are other distinct cohorts in higher education in the USA and around the world (e.g. more selective large public universities, large and small highly selective private universities) with different educational settings. In these cases, the business school and the economics department might have the same acceptance requirements or the reverse from the university under study. This distinction between acceptance criteria is important because the DBM phenomenon occurs at varying degrees across educational settings. For universities more selective than the university under study, I would hypothesize that the data will reveal the DBM phenomenon to be quantitatively and qualitatively less prevalent, although still present. For example, the percentage reported in this study is notably higher than the 34% reported by Salemi and Eubanks (1996) for UNC at Chapel Hill for the years 1983–1994. The UNC is generally more selective than the university under study. Nevertheless, I would argue that the conclusions derived are valuable across educational settings.

For example, in Australia, the UK, the USA, and in other countries, undergraduate students may undertake business and economics majors as separate degree programs at some universities, where initial entrance requirements will differ, thus the DBM phenomenon is present. Alternatively, students can take economics majors within the same degree program as part of the business school where there is typically little impediment to changing majors other than satisfying prerequisites and resigning themselves to a longer time at the university depending on when they change. The implication of the later phenomenon is a reduction in the number of students majoring in economics. For the Australian case, the declining number of students studying economics within the business school, as a result of the increased popularity of business, has encouraged the development of processes to combat the negative perception of economics and the advancement of innovative methods of teaching (Johnston et al. 2000; Marangos 2000, 2002a, 2002b, 2003, 2006; Ward, Crosling, and Marangos 2000, 2001). Thus, in Australia, the UK, the USA, and other countries, there are cases that share many of the trends that are provided by the DBM hypothesis with a partial rationale; nevertheless, there are also cases that do not apply elsewhere as thoroughly.

However, I am not, explicitly or implicitly, attempting to extrapolate the conclusions beyond the institutional profile of the university under study. I would restrict the realm of applicability of conclusions to economics departments at universities with similar institutional profiles to that of the university under study. Further research should consider the need for broader cross-sectional corroboration of the findings incorporating the international dimension of the issue.

6. Conclusion

In this paper, we identify DBMs and compare this cohort's subsequent academic performance in economics with non-DBMs. The registration system of the university under study aids in this respect by actually having an administrative category called OOSB, that is, students who are not admitted to the business school when they enter the university under study as freshman (first year). The fact that this cohort is generally less academically qualified is amply demonstrated in Table 1; nearly 92% of the OOSBs who ended up in economics never met the business school requirements. We also identify some sub-cohorts within the DBM economics majors and non-DBM

economics majors. These sub-cohorts, such as EPS, are useful in demonstrating that DBMs are truly the poorest performers in economics before and after choosing the major compared to non-DBMs. We speculate that the lower academic performance within the DBM cohort reflects a lack of aptitude and genuine interest, as economics was a 'second-best' choice for most, and this choice was probably motivated by the DBMs' presumption that economics is the closest substitute for business.

In answering the questions that were put forward in the first section, it is concluded that this population of DBMs is more likely to be 'inappropriate' for economics than non-DBMs, and their average GPA after declaring economics as their major is still lower than that of non-DBMs. In addition, it is revealed that DBMs have lower grades than non-DBMs in every core economics course as well as calculus. Finally, increasing the restrictions of admission criteria either in the business school or in the economics department decreases *ceteris paribus* the number of economics majors by enhancing the quality of students measured by an increase in average GPA entering the program. Joining the business school would result in a decrease *ceteris paribus* in the number of economics majors by 83% and raise the average GPA by 27.04%. Requiring a B- or greater in introductory economics would reduce majors by 32.8% and raise the average GPA from 2.70 to 2.82.

Acknowledgements

I am grateful to Chris Hannum for research assistance and Timothy Wunder, Geoffrey Schneider, and Tonia Warnecke for their valuable comments. I am also grateful to two anonymous referees and the editor of the journal.

Notes

1. The study does not compare the changes in enrollment in economics majors with the changes in demand for a business degree or how the presence of DBMs affects the demand for the economics major over time, which was the goal of the Salemi and Eubanks (1996) paper.
2. GPA is calculated using the following method. First, the total quality points are calculated by using the relationship: if the grade received is A+, there are 4.000 quality points per credit; for a grade A, 4.000 quality points per credit; for A-, 3.667 quality points per credit; for B+, 3.334 quality points per credit; for B, 3.000 quality points per credit; for B-, 2.667 quality points per credit; for C+, 2.334 quality points per credit; for C, 2.000 quality points per credit; for C-, 1.667 quality points per credit; for D+, 1.334 quality points per credit; for D, 1.000 quality points per credit; for D-, 0.667 quality points per credit, and for F, 0 quality points. The total quality points are the result of the multiplication of the quality points for a grade by the number of credits for the course for each course taken. Then we add up the total number of credits and the total number of quality points. Finally, we divide the total quality points by the total credits to calculate GPA. Thus, the GPA is within the range 0 and 4.000.
3. Only course titles would be used from this point onwards.
4. It can be argued that the lower grades awarded to economics majors are the result of a naturally severer standard of marking found in the economics department. Nevertheless, I am comparing between the different sub-categories of students of economics, and not between economics and business students. Hence, all students in economics under examination suffer the same severity in marking; if there is such marking, then there is no bias.
5. Unfortunately, we do not have the data to make predictions regarding increasing the standards of entry requirements to the business school. We could not gain access to any data about economics grades and GPAs for students outside of the economics program, as data were provided only by the economics department. Therefore, we do not know how many business majors would have been rejected if their standards were raised, for example, to a 3.1 overall GPA. Along the same lines, we could not make any predictions about how

much the total number of business majors would increase if their standards were lowered, we can only make an estimate as to how many economics majors would be lost. In all likelihood, an increase in the already high-entry standards by the business school (a minimum of a 3.0 GPA at the time of acceptance, a minimum of a B– (2.66 GPA) in principles of microeconomics and in calculus for business) would further increase the DBM students resulting in an substantial increase in enrollments in economics and a substantial reduction in enrollments in business.

6. The economics department cannot reduce the standards of entry beyond the university requirement of a 2.0 overall GPA at the time of acceptance and a minimum of a C– in principles of microeconomics (C– is the pass grade for courses of the major).

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