The impact of employment and domestic situations on student performance in introductory economics

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Abstract

More time spent on paid and domestic work means less potential study time so students in employment and with domestic responsibilities may be at some disadvantage compared to full-time, unencumbered students. Previous studies of the impacts of paid employment on student results have not produced consistent evidence of positive or negative effects. This study extends such work to include the domestic situation and in particular the time spent on domestic work. Other social variables related to educational background and current living situation are included in the study in order to develop a more comprehensive model of the impact of study context on achievement.

A model of the impact of social and cultural variables on student achievement in an introductory economics course at an Australian university is developed through a stepwise regression and some cross tabulated tables are used to further examine grade distributions. The model suggests that spending more time on paid and domestic work is positively correlated with higher achievement, as is having a permanent partner, although the model does not explain a lot of the overall variance in results. The variable of available study time per course being undertaken was not significant. Analysis of results by categories of work/study combinations suggests however, that there may be some polarisation in achievements within both employed and non-working student sub-groups.

Key Words: student performance**, s**tudent employment**,** domestic work

Introduction

Students select combinations of paid employment, domestic work, study (including class attendance and associated activities), sleep and leisure. Assuming non-compulsory class attendance, as in this case, paid employment will generally be the least flexible activity, with domestic activities involving care and management of dependents, especially small, disabled or primary school children also being relatively time inflexible. All time not spent on paid or domestic work could be considered as available for study and an increase in the former will reduce the latter. From that comes the main hypothesis for this study that total study and paid and domestic workload will be inversely correlated with achievement levels.

The origin of this study was in an observation by teaching staff that the two higher final grades (75 percent or more) in introductory economics seemed to be disproportionately achieved by 'internal' or on-campus students, compared to 'external' or distance students. It is a university goal to try and ameliorate as much as possible any disadvantage that might be associated with being an external student. If domestic and employment responsibilities are found to throw up barriers to achievement, then this poses some dilemmas with regard to university policies for how much latitude and assistance should be extended to affected students. For example, course leaders may accept work and domestic responsibilities as an acceptable reason for late submission of assessments.

In the first of what was to become a sequence of three annual surveys, student results were analysed considering variables that included learning mode (external or internal) and other social and educational variables identified in other studies of achievement in tertiary education in general and economics in particular. Previous studies have found that statistically significant variables associated with student performance in economics courses include: tertiary entrance (TE) scores (Paul, 1982; Junor *et al.* 1994; Brasfield *et al.* 2002); having completed a high school economics course (Junor *et al.* 1994; Brasfield *et al.* 1997); having undertaken upper level high school maths (Junor *et al.* 1994); university experience (Borg *et al*, 1989); expectations of own performance or self-efficacy (Karstensson and Vedder, 1974; McKenzie, 2001); and gender (MacDowell, 1977; various studies cited in Hirschfield *et al.* 1995). Those with more tertiary experience, that is having undertaken more

courses, have also been found to be more likely to pass an economics course (Borg, 1989). From other discipline areas, higher TE scores were also found to correlate with higher university grade point averages amongst Australian science and technology students (Mackenzie and Schweitzer, 2001), while the positive self-efficacy effect was also noted in accounting students (Rankin *et al.* 2003).

With regard to study mode Brasfield *et al.* (2002) concluded that internal or day students were more likely to pass and more likely to achieve better grades in an introductory economics course than were external (distance) students. Such an outcome has also been noted when comparing the results of internal and external students in introductory accounting classes (Waldmann and de Lange 1996; Rankin *et al.*, 2003). The findings from the first survey (year 1) were consistent with these two studies and with the positive correlation to TE. It was then decided to examine additional social variables in the second year of the study, including linguistic background and paid work. In that year there was no significant difference between internal and external students in terms of achievement and no conclusive findings on any impact of paid work. The questionnaire was further refined, domestic work included and the results of that final survey are discussed here.

The Teaching and Research Context

The study is of students in a one-semester introductory economics course (subject), covering basic micro and macroeconomic concepts. It is largely a service course for business and commerce students. The internal students have a two-hour lecture, a one-hour tutorial and one hour of peer assisted learning but no sessions are compulsory and internal students can buy a study guide and log on to course discussion groups, effectively studying as a 'distance' student if they wish. McInnis (2001) suggests that students previously considered as 'full-time' and on-campus are increasingly mixing work and study and the campus is no longer the dominant non-domestic location in their lives. Lecture and tutorial attendance for the sample considered here varied between 40 and 70 per cent of the total official internal class numbers. Assessment for internal students consisted of two multiple choice class tests, worth 7.5 percent each, an assignment based on three questions, worth 20 percent and an exam consisting of multiple-choice, short answer and essay questions, worth 65 percent.

External students did the same assignment and exam as the on-campus students but instead of the two class tests, they did two multiple-choice tests that were essentially open-book with the answers mailed in for computer marking. In addition to the on-line material, external students could participate in two telephone tutorials during the semester though these were of limited time and the participation rate was less than 10 per cent. External students could also phone the course leader, though this contact is mostly used to manage administrative, rather than academic matters. Some students set up their own regional study groups. Approximately 12 per cent of external students attended the residential school, which involved up to 15 hours of contact time. Some students in major centres also attended peer assisted learning sessions. A few (3-4) external students attended regular classroom lectures and tutes. Study loads varied from 1 course being taken in the semester to 4 courses, where the latter is considered a full-time load.

Data Collection and Processing

The population for the study was all students who were still enrolled by the official change of enrolment deadline (3 weeks into the semester). Data for gender, mode of learning and results for all students were generated from the university information base and downloaded to the SPSS statistical program. Other data, including information on work commitments and background, was collected by survey. A questionnaire was distributed in class for internal students and posted out with study material for the external students. The dependent variable used for the regression models was the final mark for the course with grade used for developing categorical tables. The information sources and variables are set out in Table 1.

Table 1 - Study variables

Variable	Values/range	Data source
Final mark	0-100	University databases
Exam mark	0-100	
Time spent in paid employment (hrs/wk)	0-50	Survey
Time spent on household work (hrs/wk)	0-60	
Total time in employment and household work	0-110	
Available study time per course	7-60	Calculated
Country of majority high schooling	Australia and other English-speaking = 0; Others =1	Survey
Permanent partner	No = 0; Yes = 1	
Children in residence		
Previous economics study		
Study Load*	0=Part-time; 1 = Full-time	University databases
Gender	Female = 0; Male = 1	
Official mode of attendance for this course	Internal = 0; External =1	
Grade	FN (Not complete);** F (Fail, <49%); C (Pass, 49-64%); B (Credit, (65-75%); A (Distinction (75-84%); HD (High distinction 85% +)	

* Part-time is 1-2 courses for the current semester. Full-time is 3 or more.

** Students did not complete all pieces of assessment. Their results were not included in statistical tests.

The first six variables are linear, while the remainder are categorical. Grades are not used in the regression model but are used for categorical tables.

A model based on the exam mark rather than final mark was also run but is only briefly discussed here. Available weekly study time was calculated by subtracting a nominal sleeping period (8 hours x 7 days) from the total week of 168 hours to leave 112 hours. Then, the sum of time spent on paid and domestic work was subtracted from 112 with the remainder being the total available study time. This was then divided by the number of courses being undertaken to yield the available study time per course. It is recognised that this does not reflect the variety of social and study

situations but the intention was to try and make allowance for the differences in enrolled load.

The whole class comprised 308 internal and 309 external students and there was an overall survey return rate of 63.7 percent. Some analyses were conducted to identify possible non-response bias where full population data was available. Table 2 shows a summary of the survey response rates by mode of study and gender.

Table 2 - Survey Response Rates

Response Rate (%)					
Internal Students			External Students		
Total	*Male*	*Female*	*Total*	*Male*	*Female*
73	66	80	54	45	61

The response rate from external students is lower than for internal students because the collection of those questionnaires relied on self-motivated postage as opposed to administration and collection in a lecture period. The response rate of males overall is lower.

According to a Chi-square test, returning a survey was a significant variable, positively associated with grade (Pearson stat= 34.5 and sig. = 0.006). In particular, of those who did not return a survey, 28 percent did not complete all assessment (FN), compared with 10 percent of those who did return a survey. For women studying in external mode, 36 percent of those who did not return a survey did not complete all work. The external survey respondents were 'over-represented' in the three highest result categories (High distinction, A and B) and under-represented in the Fail category, when compared to the whole population of external students. That is, the non-respondents contain a disproportionate number of poor performers or at-risk (of dropping out) students.

The analytical method used was a forward stepwise regression so as to be able to include a range of variables, both linear and categorical and to see the effect of adding those one at a time, especially the possible explanatory power of each variable. Some categorical analyses are included, following McKenzie *et al's* (2001) suggestion that the impact of work on achievement could be considered according to various combinations of work and study load, especially full-time students who work part-time and full-time workers who study part-time.

An initial stepwise regression was run, resulting in two models with the two variables in the final model, being living with a permanent partner and the sum of domestic and paid hours. Statistics for these models are summarized in Table 3.

Table 3 - Models Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig
1	0.266	0.071	0.068	15.908	22.43	0.000
2	0.303	0.092	0.086	15.755	14.79	0.000

N=295

a Predictors: (Constant), Do you live with a spouse or permanent partner?

b Predictors: (Constant), Do you live with a spouse or permanent partner?, total hours

All other variables, including available study time per course were excluded during the process. From the second model, the adjusted R Square suggests that the presence of a spouse or partner explains 6.8 percent of the variance in results and that the inclusion of the total hours spent on domestic duties and paid employment explains a further 1.8 percent. The summary of the second model is reported in Table 4.

Table 4 - Final Model Summary

(Constant)	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Permanent partner	5.997	2.311	0.172	2.596	0.010
Total hours	0.111	0.043	0.172	2.593	0.010

Dependent Variable: total marks

Analysis of grades achieved by relationship status shows that more than 17 percent of those with a permanent partner were awarded a distinction or high distinction, compared with less than six percent of those without a partner. Of the non-partnered group, more than 50 percent failed or did not complete the assessment, compared with only 20 percent of the partnered students.

When a second model was developed using the exam mark instead of total mark, having a partner was still positively associated with achievement but the total hours variable was excluded and gender was included. According to this model, being

female was a disadvantage. Gender differences in relation to forms of assessment have been noted elsewhere (Siegfried, 1979; Ferber, Birnbaum and Green, 1983; Hirschfield et al, 1995) which is one of the reasons why the range of assessments described earlier are used.

Returning to the main model based on total mark for the course, the elements of that model are further examined in grade tables. With regard to domestic work, a table of results by domestic work categories shows that the busier people were in the home, the less likely they were to fail and the more likely they were to achieve a distinction or high distinction, as shown in Table 5, recalling that time spent on domestic work alone was excluded from the model.

Table 5 -Grades Achieved and Time Spent on Domestic Work

Hrs/wk	FN*	F	C	B	A	HD	N
<6	13.3	38.7	25.3	16.7	5.3	0.7	150
6--14	18.5	28.6	26.1	16.0	9.2	1.7	119
15-24	14.5	21.8	27.3	27.3	7.3	1.8	55
25+	13.9	13.9	41.7	16.7	11.1	2.8	36
						Total	360

* Did not complete one or more pieces of assessment

The proportion of distinctions and high distinctions increases with each increase in time spent on domestic work just as the proportion of failures decreases. On the other hand the relationship between paid work and achievement is somewhat more ambiguous, as shown in Table 6, where study load is included.

Table 6 - Grades achieved and Work/study combinations

	FN	F	C	B	A	HD	N
No work & PT study	31.8	31.8	22.7	13.6	0.0	0.0	22
No work & FT study	17.0	37.6	21.3	13.5	7.8	2.8	141
PT work & PT Study	22.2	33.3	22.2	11.1	11.1	0.0	9
PT work & FT study	6.2	46.2	18.5	21.5	7.7	0.0	65
FT Work & PT study	9.5	16.4	39.7	24.1	9.5	0.9	116
FT work & FT study	18.8	25.0	34.4	15.6	6.3	0.0	32
							385

There are non-working, full-time students comprising 33 percent of the total sample and 90 percent of them are enrolled as internal students. This group provides proportionately more of the high distinction students but there is also a high failure rate. There is a small group of students who do not work and are enrolled in only one

or two courses for the semester, 75 percent of them in external mode and more than 60 percent of them failed or did not complete the work. These two non-working groups provide 44 percent of the fail grades and presumably generally low marks which would contribute to the model results.

Another 15 percent of the respondents are in full-time study with part-time work and again 90 percent of them are enrolled in internal mode. This group has the highest outright failure rate but almost 30 percent of this group achieved a credit or better. So again there are hints of a possible polarisation within a sub-group. Those undertaking full-time work and part-time study are the least likely to fail or not complete. They comprise 29 percent of the sample and 95 percent are enrolled in external mode and 60 percent of them have a permanent partner, compared with only 11 percent of the full-time students.

Discussion

Paul (1982) found an inverse and statistically significant correlation between the number of hours worked and achievement by students in a US macroeconomics course. The results here do not support that finding, although two possible sub-groups may warrant further study. First there are a few high-achieving, non-working students, suggesting that perhaps some students, when free of other work, are able to achieve the higher grades, though there are also many more students, free of work, who fail. Second, those studying full-time and working part-time were more likely to fail the course than any other work/study combination group. This may relate to Rubin's (1977) finding that business and economics students in a US college who had to work for financial reasons, were likely to achieve lower grades than other students. There may therefore, be students seeking to maintain a full study program while working and thus putting themselves at some risk in terms of achievement.

Junor *et al.* (1994) found that there was a negative and significant correlation between students' results in an introductory economics course and being a part-time student but the study load alone is not significant in this study. Indeed, those undertaking full-time work and part-time study are the least likely of any work/study combination to fail. On the other hand, there is some indication of some polarity within the group undertaking full-time study and part-time work. This group had the highest rate of outright fails, the lowest proportion of passes and a relatively high

proportion of credits. This suggests that this combination of work and study may impact on the marginal students, possibly with potential passes becoming fails. Finally, Pantages and Greedon (1975, cited in McKenzie 2001) concluded that full-time students who worked in paid employment were more likely to withdraw from a course. Taking the failure to complete assessment items as an indication of effective withdrawal, there is no evidence here to support that proposition.

The model does not conclusively show that paid work is a positive factor in itself as has been found in some other research (D'Amico, 1984; Lillydahl, 1990). The most that can be said is that the 'busy' people tend to do better, where activity is in paid or domestic work. This industriousness may be related to a number of factors which do impact on performance. First, higher levels of domestic duties, and work may tend to go with maturity which may in turn be associated with a greater capacity to organise and to exercise self-discipline. Second, busy people may have to be organised to cope and this capacity to organise would be beneficial in study. Third, and somewhat speculatively, there may also be physical effects, with activity generating additional capacity to undertake intellectual work. Finally, there is the issue of life stability, which may often come with maturity and responsibilities. In particular, the positive impact of partners suggests the benefits of stability and/or maturity.

Conclusions

From this study, there is a positive correlation between the amount of (paid and domestic) work undertaken and final mark. The sample, however, could be skewed, excluding in particular some 'at-risk' women, who may be the ones that are most affected by domestic and work responsibilities. Furthermore, there are some indications from the distribution tables, of polarisations within student sub-groups. There may be two groups of non-working students, those who are struggling with and/or disengaged from study and those who are fully engaged and achieving high results. Full-time workers undertaking part-time study also tend to do well, at least in the pass, credit and distinction categories. On the other hand, there are some full-time students who are working who may be more at risk of failing.

From a course administration perspective, these findings mean that those with high paid and domestic work loads are not necessarily students at greater risk of failure or

dropping out of courses. Hence questions about the need for flexibility on assessment deadlines because of paid and domestic work, for example remain to be considered, especially given the need to also consider issues of administrative consistency and equity. On the other hand, the principle of equal treatment may be at odds with the reality of particular sub-groups that might benefit from some flexibility, not to mention possible consequent improvements in student retention. The pastoral implications are that there may be students who do need advice on balancing domestic and paid work with study load but there is no evidence from this research of a simple trade-off. Thus, there are other variables to be identified and these may well go to matters of personality and motivation.

To develop this work further, there would need to be a higher questionnaire return rate from the external students, which could be achieved using on-line survey systems linked to the course home pages that are used at this university, with follow-up email reminders. On the other hand, further testing of possible explanations for the identified relationships between work and achievement is more difficult. Possible explanatory factors include: the positive mental, and perhaps even physical, spill-over benefits from being busy; the necessity for a higher degree of organisation when working; and that having paid and domestic work is to some extent a function of maturity, which is actually the factor that contributes to academic achievement. Testing these further may require more specific time use and personality questions or a greater use of interviews. To complicate things further, the concept of maturity may be more than just a function of age since age has never been revealed to be a significant variable in the modelling of achievement in the introductory economics class.

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