Does Money Matter? The Effect of Instructional, Research, and Administrative Expenditure on Universities' Performance[*]

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Abstract

This paper investigates the impact of different categories of expenditure on organizations' resources inputs and the impact of resources on universities' teaching and research performance. The results suggest that instructional and research expenditure improve the resources in universities, but administrative expenditure has no effect. Further, The evidence shows that resources improve research performance but not teaching performance for universities. However, administration factor serves no role in organization performance.

Keywords— Administrative Expenditure, Resource Allocation, University Performance

1 Introduction

The government and society invest a great amount of money on higher education. The per-student expenditure at higher education level is even higher than in the primary and secondary level. Figure 1 presents the per-student expenditure by the level of education of different countries. For Organisation for Economic Co-operation and Development (OECD) countries, per-student expenditure at tertiary level (USD 15,656) is 56% greater than the secondary level (USD 10,010) and 81% greater than the primary level (USD 8,631). For Taiwan, per-student expenditure at tertiary level (USD 6,085) is 54% greater than the secondary level (USD 3,943) and 7% greater than the primary level (USD 5,684).

Moreover, the government plays an important role in the funding of higher education. Figure 2 presents the funding sources distribution of different countries. For Taiwan, 46.85% of the funding of higher education comes from the government. Even for countries with highly marketized of higher education, such as the United States, government funding still accounts for 35.21% of total higher education expenditure. In Taiwan, the expenditure on higher education of the Ministry of Education (MOE) of 2017 is NTD 89 billion (around USD 2.89 billion) which accounts for 4.62% of the total central government expenditure (DGBAS, 2018; MOE, 2018).

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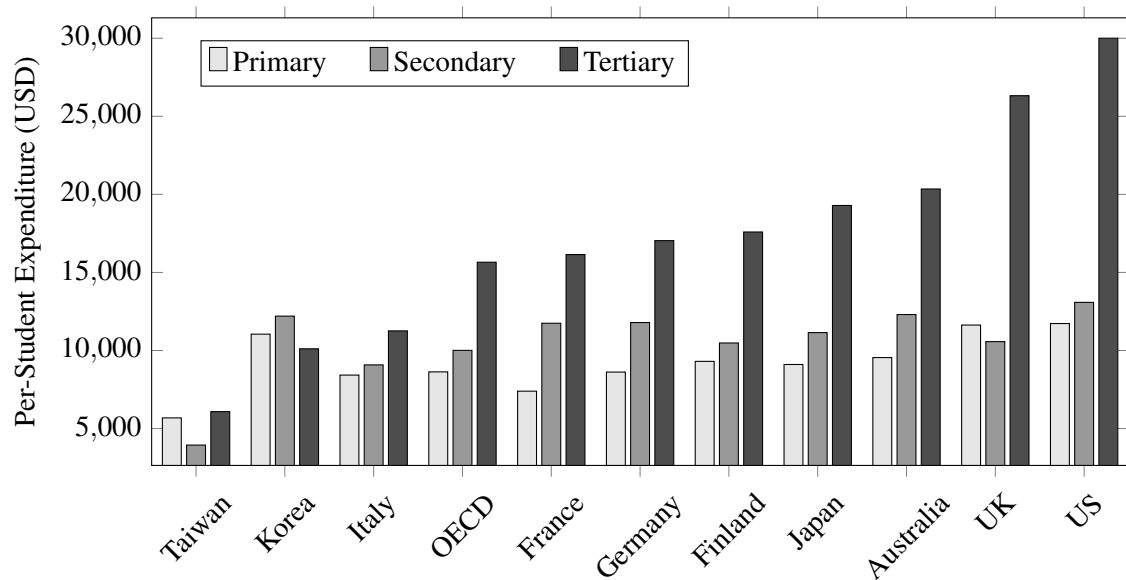
Figure 1: Per-student expenditure by level of education

Notes: Year of Data are 2015 to 2016. Data from OECD (2017) Education at a glance 2017: OECD indicators & MOE (2017) Education statistics.

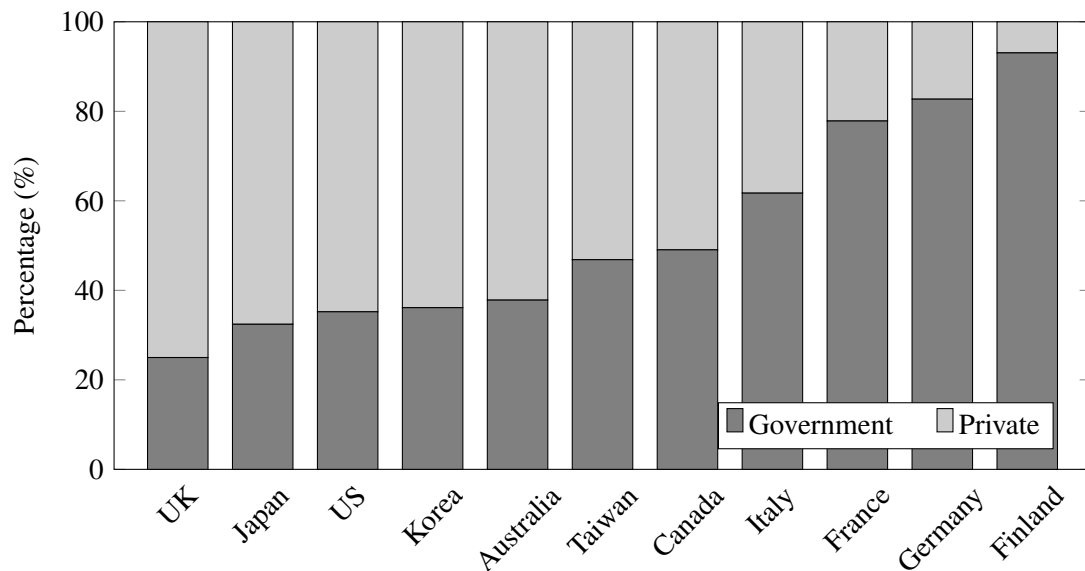Figure 2: Percentage of government and private funding sources for higher education

Notes: Year of Data are 2015 to 2016. Data from OECD (2017) Education at a glance 2017: OECD indicators & MOE (2017) Education statistics.

Given the great amount of investment in higher education, investigating whether these resources can improve organization performance is important. Coleman et al. (1966) suggest that school funding (measured in terms of per-pupil expenditure) has little effect on student achievement (measured in terms of test score and educational attainment). Hanushek and Luque (2003) review 163 studies regarding the expenditure on students' performance and find only 27% of studies support a significant and positive effect of educational expenditure on student performance (measured as standardized test scores, class attendance, or educational attainment). "Does money matter in education" is still a controversial and unsolved question nowadays.

However, previous studies mainly focus on primary and secondary education (Hyman, 2017; Grogger, 1996; Wößmann, 2003). Higher education receives less attention compared to compulsory education. Though the number of total students is greater in primary and secondary education than in higher education, the importance of higher education should not be less than primary and secondary education. The reasons are that the money invested in higher education is huge and that higher education may widely benefit the whole society (Bloom, Hartley, & Rosovsky, 2007). This paper investigates the different categories of expenditure effect (instructional, administrative and research expenditure) on universities and colleges' teaching and research performance.

2   Data & Method

The samples of this paper are the public and private universities and colleges in Taiwan. Table 1 provides the number of observations by types and tracks. The total number of universities and colleges included in this paper is 139. One-third of institutions are public, the other two-thirds are private. Half of the institutions are general, the other half are vocational.

Table 1: Number of Observations, by Types and Tracks

	Public	Private	Total
General	33 (24%)	36 (26%)	69 (49%)
Vocational	12 (9%)	58 (41%)	70 (51%)
Total	45 (33%)	94 (67%)	139 (100%)

The observation period of this paper is school year 2017/2018 (from 2017 August to 2018 July). The data on expenditure comes from the financial reports of each university or college. The data on resources and performance comes from the Ministry of Education (MOE). The data on control variables comes from the MOE and the University Admission Committee. This paper uses path-analysis to examine the relationships between expenditure, resources, and performance.

3   Results

3.1   The Relationship between Expenditure & Resources

Figure 3 and figure 4 summarizes the path relationships from different categories of expenditure to resources allocation.Instructional expenditure is the most powerful predictors for institution resources, following by research expenditure. Administrative expenditure has no role in improvement resources. Even for staff resources, the estimated coefficients of administrative expenditure is not significant.

3.2 The Relationship between Resources & Teaching Performance

Figure 3 summarizes the path relationships from expenditure to resources to teaching performance. Both administrative expenditure and student/staff ratio have nothing to do with resources and teaching performance, supporting no effect of administrative factors on organization performance. Some of the resources are related to performance, but the effect direction is opposite to the relationships that this paper expects.
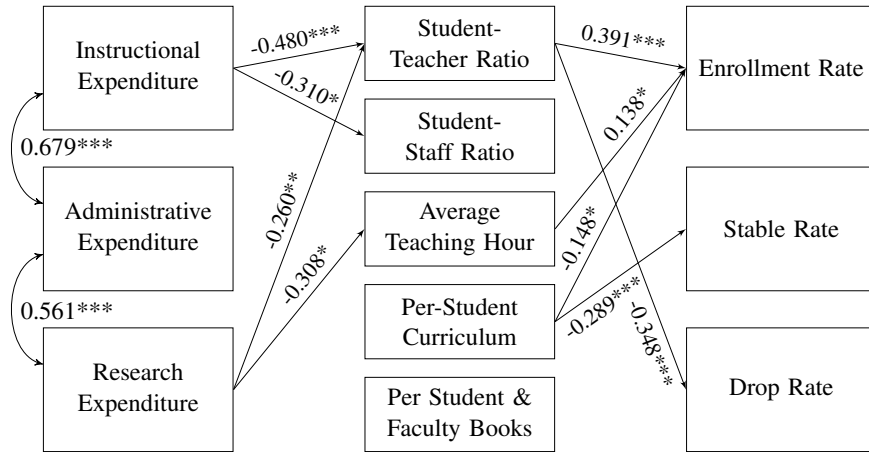
Figure 3: The path diagram of teaching performance

Notes: The coefficients shown in the table are the standardized regression coefficients. The paths with non-significant coefficients are omitted. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

3.3 The Relationship between Resources & Research Performance

Figure 4 summarizes the path relationships from expenditure to resources to research performance. Student/teacher ratio is related to all of the research performance indicators, indicating that human capital is the most important factor for research performance. Average teaching hour and per-student curriculum are negatively correlated with research performance. Namely, if teachers need to spend more time on teaching works, their research performance decrease. Therefor, organizations should notice the trade-off between teaching and research works.

4 Discussion & Conclusion

4.1 Research Finding

This paper finds that more instructional expenditure and research expenditure lead to more resources. However, Administrative expenditure has nothing to do with resources. The results support that increase in institution resources leads to an increase in research performance. Conversely, resources inputs do not improve reaching performance.
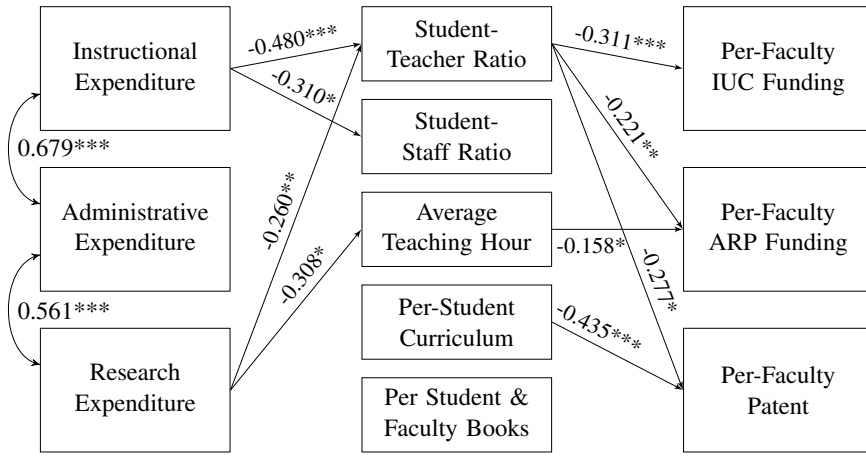
Figure 4: The path diagram of research performance

Notes: The coefficients shown in the table are the standardized regression coefficients. The paths with non-significant coefficients are omitted. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

The estimation denotes that students' family background (measured as the percentage of disadvantaged students in this paper) and initiate ability (measured as average admission score in this paper) are more important for teaching performance than school resources. This finding is consistent with precious researches (Coleman et al., 1966; Wößmann, 2003).

regarding research performance, this paper finds that resources inputs are very important for research performance. The finding is consistent with previous researches (Auranen & Nieminen, 2010; Fu, 2017). However, this paper does not control the ability of faculty (such as the amount of funding or the number of patents last year). Hence, the result provides no information on the comparison between the importance of resources and faculty personal characters.

4.2 Limitation & Recommendation for Future Studies

Firstly, this paper only includes one-year data. This fact leads to two undesirable results. One is the limitation in sample size, which is only 139 institution-year. Another is that this paper can not control for previous performance or fixed institution effect, which is really important to identify the relationship between inputs and outcomes.

Secondly, this paper does not consider the casual simultaneity between resources and performance. Correlation does not mean causality. Poor teaching performance may result in fewer students and lead to higher per-student resources. On the other hand, great research performance may attract more research funding. The evidence of strong relationships between resources and performance provides no information about resources causal effect on performance.

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