Spatial Disparities and Subsidiarity in Centralized Federalism: Australia's School System

Térbeli egyenlőtlenségek és szubszidiaritás központosított föderalista rendszerben: Ausztrália iskolarendszere

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ABSTRACT: Australia is imbalanced geographically and politically: its growth is extremely concentrated in four major city-regions that stand in contrast to sparsely populated, stagnant rural areas. Its political power is exceptionally centralized, consisting of vertical fiscal imbalance between the Commonwealth and the states, and particularly weak local governments. This study focuses on spatial disparities in school achievements and resources, and the effectiveness of policies to alleviate them, in this context of Australian centralized federalism. Based on an analysis of data on finance and achievements in the NAPLAN tests in Australian schools, the study confirms that Australia implements an effective nationwide redistributive policy that refers to remoteness, but fails to eliminate spatial differences in student achievement. Vertical political imbalance of Australia's federalism seems to work in favor of consistent needs-based redistribution, retained despite the variety of intermediary bodies and the plurality of private providers, in addition to the states. This plurality partly retains principles of subsidiarity, despite the exclusion of local governments from school education.

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KULCSSZAVAK: területi egyenlőtlenségek; oktatási egyenlőtlenségek; centralizált föderalizmus; szubszidiaritás; Ausztrália

ABSZTRAKT: Ausztrália földrajzi és politikai értelemben komoly egyenlőtlenségeket mutat: növekedése rendkívüli mértékben összpontosul négy nagyvárosi régióra, amelyek éles kontrasztban állnak a ritkán lakott, stagnáló vidéki területekkel. Politikai hatalma kivételesen centralizált, amelyet a Nemzetközösség és az államok közötti vertikális fiskális egyensúlyhiány, valamint különösen gyenge helyi önkormányzatok jellemeznek. Ez a tanulmány az iskolai teljesítmények és erőforrások

térbeli egyenlőtlenségeit, illetve a mérséklésükre irányuló politikák hatékonyságát vizsgálja Ausztrália központosított föderalista kormányzati rendszerében. Az ausztrál iskolák pénzügyi mutatóinak és az ún. NAPLAN teszteredmények adatainak az elemzése alapján megállapítja, hogy Ausztrália hatékony, a földrajzi elhelyezkedés sajátosságait figyelembe vevő országos újraelosztási politikát alkalmaz, azonban nem képes felszámolni a tanulói teljesítmények térbeli különbségeit. Úgy tűnik, hogy Ausztrália föderalizmusának vertikális politikai egyensúlyhiánya kedvez a következetes, szükségletalapú újraelosztásnak, amely fennmarad az államok mellett működő különféle közvetítő szervezetek és a sokszínű magánszolgáltatók ellenére is. Ez a sokszínűség részben megőrzi a szubszidiaritás elvét, annak ellenére, hogy a helyi önkormányzatok kimaradnak az iskolai oktatásból.

Introduction

Widening economic gaps between large urban areas, well-connected to the global economy, and the rest of the space-economy have been debated, since the 1990s, in the context of globalization (Nijman, Wei 2020) and new economic geography conceptions that emphasize agglomeration economies (Gaspar 2020). Spatial inequalities have been evident also in the quality of public services, such as health, education and cultural amenities. Regional socioeconomic weakness translates into fiscal weakness of governments, and together with low densities, limited purchasing power and political weakness eliminates thresholds and limits funding for the provision of public services. Inferior public services negatively influence quality of life, exacerbating the disadvantage of peripheral locations. Governmental divisions of power, particularly the distinction between different forms of unitary and federal structures, are therefore of prime significance in understanding the public service component of spatial inequalities (Sellers et al. 2017).

Our study addresses spatial inequalities in public services through the case of school education. We examine inequalities in both student achievements (outcomes) and school resources (inputs), providing insights on whether spatially differentiated public subsidies effectively address unequal spatial outcomes, in the context of highly centralized Australian Federalism. Australia's school system is characterized by a complex division of regulatory and funding powers between the two higher levels of government: Commonwealth and states. We assess the impact of Australia's redistributive policy and its limits, based on an Australian Curriculum Assessment and Reporting Authority (ACARA) dataset that includes school finance and achievements.

We argue that Australia's centralized federalism, characterized by vertical fiscal imbalance and ambitious horizontal fiscal equalization, does produce a consistent equalization policy at the inter- and intra-state levels, despite a substantial plurality of service providers. However, we also stress the limits of fiscal equalization in eliminating achievement gaps across localities. Results are discussed with a reference to the principle of subsidiarity, commenting on whether the spatial variations in achievements cast light on the appropriate level

from which education policy is conducted, and whether the support provided to various education associations is appropriate for their needs.

Spatial inequalities: income, public services, education

Spatial inequalities have been a perpetual theme in the spatial sciences and public policy agendas, at least since the depression of the 1930s (Wei 2015). Although focusing mainly on income disparities, studies referred to multiple dimensions of inequality (Nijman, Wei 2020), including gaps in access to public services and their quality. Public services gaps, particularly in health and education, impact quality of life and economic development, but the spatial development literature has focused on job creation and tax-base enhancement, and the role of public service redistributive policies at the spatial level has attracted limited scholarly attention.

Disparities in education are crucial, given their impact on the capacity of the local labor force and the prospects for upward mobility of the next generation. Rodríguez-Pose and Tselios (2011) emphasized that space matters for educational inequalities, revealing a strong correlation between educational attainment and inequality across regions in Europe. In the USA, students living in inner city and rural areas exhibited lower educational achievement than those of suburban counterparts, due to disadvantages in both family and school resources (Roscigno, Tomaskovic-Devey, Crowley 2006). Studies in Korea and Italy have specifically dealt with disparities between schools and the role of public finance in alleviating them (Ferrari, Zanardi 2014; Jeong, Kim, Hong 2013). Voluminous literature has discussed determinants of school spending or student achievements, but relatively few have attempted to link the two (Gigliotti, Sorensen 2018; Hanushek, Woessmann 2017), and a focus on spatial inequalities has been even rarer.

Such inequalities can inflame tensions between community desires for local autonomy and needs for resource redistribution in order to reduce achievement gaps. The impact of decentralizing tasks such as school curriculum, hiring and firing of teachers and school management and finance from national to regional, local and school levels in the name of the principle of subsidiarity has attracted considerable attention (Hega 2000). It has been usually suggested that decentralization of school administration to the local level positively influences achievements and innovation, by allowing educational policy to be tailored to local needs. However, implications of different paths of decentralization on various educational outcomes have been found to be complex, depending on political, policy and socioeconomic contexts (West et al. 2010). Moreover, most research has focused on education policy divergence or convergence, rather than on the spatial implications of rescaling responsibilities for school education (De Rynck 2005; Dupuy 2014; Wallner 2017).

Australian context of centralized federalism and the principle of subsidiarity

Australia is a federation of six states and two territories, notable for its geographical and political imbalances. Geographical imbalance concerns the distinction between the vast sparsely populated land and the concentration of growth in a few large urban regions (Hu, Blakely, Zhou 2013; van Staden, McKenzie 2019). Increasing spatial inequalities, largely studied within growing metropolitan regions, have been attributed to neoliberalism (Randolph, Tice 2017), but despite rapid growth of major city-regions, changes of spatial variations in economic growth per capita in Australia have been small (Daley, Wood, Chivers 2017).

Political imbalance consists of fiscal imbalance arising principally from centralised taxation powers and of the exceptionally small share of local governments in Australia's public sector. Australia's constitution left most domestic governance responsibilities to the states, but financial power and policy reach of the Commonwealth has continuously expanded, creating a vertical fiscal imbalance between the Commonwealth and the states (Fenna 2019; McLean 2004). In 2017/18, the Commonwealth collected approximately 80% of taxation revenues, the states 16%, and local governments less than 4%. The relative strength of central government revenues allows for ambitious horizontal fiscal equalisation efforts, including the critical area of education.

Australia's constitution assigns the states full powers over education: states and territories regulate both public and private schools. The states acknowledge that 'the education of a child is primarily the responsibility of the child's parents', but it is the 'duty of the state to ensure that every child receives an education of the highest quality' (Parliament of New South Wales 1990). Despite the constitutional assignment of power, in practice the Commonwealth has used its vital funding support to impose reforms, such as the national assessment program in literacy and numeracy, and the national curriculum (Lingard, Lewis 2017). Legislative centralization that obliges states to adhere to directives of the Commonwealth came first, followed by some administrative centralization (Fenna 2019), both geared towards a more nationally-consistent, performance-focused schooling framework (Hinz 2018).

Around 65% of Australia's 3.8 million students are educated at public schools. In the 2016/17 fiscal year governments funded public schools at the level of $AUD17,531 per student, with the state governments providing the majority of this money. Commonwealth funding has grown considerably since introduced in 1974, set to be at least 20% of total recurrent public funding of public schools in 2023/24 (Department of Education 2024).

Australia has a relatively large non-public school sector, mainly faith based, dominated by Catholic institutions (20% of enrolled students), with other notable representation of Anglican, Protestant and small numbers of Islamic and Jewish

institutions, termed independent schools (Drew, Kortt, Bec 2019). Public funding of private schools by the Commonwealth has complex roots, initially aimed in the 1970s to prevent the collapse of the Catholic school system. Since introduced, the dependence of private schools on Commonwealth funding has grown substantially. In 2016/17 governments funded private schools at an average of $AUD10,644 per full time equivalent student with Commonwealth funding set to be at least 80% of total public funding of private schools, the rest coming from state and territory governments. In addition, private schools levy compulsory fees on parents and caregivers (Drew, Bernardelli, Kortt 2019).

School funding contributions from state and Commonwealth governments in Australia have been a contentious political issue, bringing down at least two federal prime ministers (Drew, Fahey 2018). Currently funding is based on the School Resource Standard (SRS), which specifies government funding entitlements for both public and private schools on a per student basis. The Commonwealth government has committed to providing a set percentage of the SRS to each school, and the states and territories are obligated to providing their share of the SRS. The SRS starts with a base amount for primary and secondary school students. A discount is then applied to the base amount for private schools to reflect the assessed parent capacity to pay. To this discounted base, increases are made for Aboriginal and Torres Strait Islanders, students suffering various disabilities and students with non-English speaking backgrounds. Further increases are made on a school-level basis to reflect the proportion of students in the lowest two quartiles of socio-educational advantage (based on measures of parent occupation and education), and school location and size (Australian Government Department of Education 2024). The objective of this formula, implemented in 2014, is to provide sufficient help for students from any socio-educational background or location to achieve their educational goals (Smith, Parr, Muhidin 2019).

Both the plurality of schools in Australia, and the concept of helping institutions to achieve their ends are consistent with the principle of subsidiarity. Minimalist interpretations of subsidiarity merely assert that services should be delivered by the smallest tier of competent government, but subsidiarity proper is located in the rich traditions of natural law philosophy and specifically considers the right assignment of responsibilities to persons, and persons in association (Golemboski 2015). Indeed, the principle expresses a strong preference for service provision at the smallest association possible and posits only an instrumental role for government (Finnis 2013). The principle argues that associations closer to the people have a better appreciation of need, are more transparent and responsive, and have a greater moral stake in ensuring that efficacious solutions are implemented (Evans, Zimmermann 2014).

A key idea of subsidiarity is that an ontology of plural social forms (starting with the family as the fundamental unit of association) is required for human

flourishing and that certain obligations must be observed to ensure that a balance is struck between the dignity of persons and persons in association, and the common good (Evans, Zimmermann 2014). To ensure that the plurality of social forms is fostered, the principle asserts two obligations: a negative obligation, which prohibits a greater association from subsuming the functions of a lesser one, and a positive obligation that requires greater associations to provide help (termed *subsidium*) in the case of *bona fide* need (Messner 1949). Notably, this help is not merely restricted to fiscal assistance, but involves all forms of support and kindness required for persons to achieve their goals (Evans, Zimmermann 2014).

The framework for education in Australia is broadly consistent with the principle of subsidiarity, supporting the formation of plural associations by parents to achieve education goals, which is instantiated in private schools. Greater associations (such as federal or state government) are not allowed to subsume the functions of these social forms: if this were to happen then the particular *munera* (gifts) that these private schools provide would no longer be available to the common good. For similar reasons, *subsidium* is provided for meeting *bona fide* needs of private school associations. The SRS, as a *prima facie* needs-based formula for providing help, is consistent with the principle. It is also appropriate for government to perform the duty of providing quality education where there are no private associations to do so.

Where arrangements differ in Australia, from those set out in subsidiarity is with respect to the assignment of powers in education to state rather than local governments (the smallest association competent to fulfil the function). Australian local government is not mentioned in the Constitution and is exceptionally weak fiscally, being responsible for an extremely low share of the total public expenditure (OECD 2017). Local governments have no role in school education. Some do run childcare centres, but as a business venture, and the vast majority of childcare facilities are private. Nevertheless, if there is a spatial distribution of education needs that is considerably smaller than the state, then the principle of subsidiarity might suggest that the present exclusion of local government may limit transparent, responsive and efficacious interventions. Moreover, a national Australian curriculum has been gradually developed and implemented since 2010 by the Commonwealth. Hence, along with increased dependency of (particularly private) schools on Commonwealth funding, national regulation of core content of studies and assessment of achievements have also consolidated.

In sum, some of the principles of subsidiarity are clearly instantiated in Australian education, but not all. There is a clear tension between the dictates of the principle and where authority actually resides – with apparent constitutional authority sometimes diluted or influenced through funding agreements tied to central government objectives.

Extant research conducted in Australia suggests that secondary school education outcomes are spatially unequal and reflect in part the spatial distribution of socio-educational advantage (Vidyattama, Li, Miranti 2018). The disadvantage of Australia's rural areas has been particularly emphasized (Roberts, Green 2013; Sullivan, McConney, Perry 2018). Work on primary school outcomes notes that 'spatial clustering [of outcomes] is related to socioeconomic status, but is not simply a reflection of that status' and that 'more research on the under-explored neighbourhood context on educational outcomes is needed to understand educational inequality' (Smith, Parr, Muhidin 2019). The following explication of our empirical methodology demonstrates how our work responds to this identified gap in the literature.

Methodology

Our examination is aimed at responding to two matters raised by the principle of subsidiarity: (i) whether there is indeed spatial variation (independent of state jurisdictions) of education outcomes that might cast light on the appropriateness of the level from which education is conducted, and (ii) whether the *subsidium* provided to various education associations is appropriate for their needs.

We employed 2017 data, with finance data lagged by one year, obtained from ACARA under deed of licence. The data is at the school level and provides details of location, funding, measures of socio-educational advantage, structural characteristics of schools, and the results obtained in the NAPLAN examinations (see Appendix). The location variable uses a five-part Australian Bureau of Statistics categorisation, from major cities to very remote places. It is based on the ARIA+ accessibility/remoteness index that measures road distances to the nearest service centres.

Our analysis included crosstabulations and a series of mixed effects regressions that are the ideal technique for data that has distinct hierarchies (as noted, much of the education legislation resides with the states). It combines fixed effects (slopes and intercepts for the entire population of schools) with random effects (intercepts for each of the states), and is ubiquitous in the education literature. Moreover, we conducted likelihood ratio tests, which confirmed that our hierarchical regressions provided the best fit to the data.

The first set of regressions examined whether location (remoteness) was associated with education outcome (NAPLAN index), independent of state jurisdiction (hence the use of mixed effects regression), in direct response to our first objective. There are good grounds for suspecting an association between space and outcomes given that Australia has distinct distributions of wealth and demographics based on geography (Vidyattama, Li, Miranti 2018). Moreover, remoteness makes finding qualified and experienced teachers more difficult (Smith, Parr, Muhidin 2019), necessitates longer commutes and after school

commitments (such as help on the farm), and less opportunity for post-school study (due to the concentration of higher education institutions in major cities) which may be a motivation for education achievement (Teese 2000). Our regressand was the z-scored average outcome for each school in the NAPLAN exams that cover reading, writing, grammar, spelling and numeracy. NAPLAN (National Assessment Program – Literacy and Numeracy) examinations were conducted annually on all year 3, 5, 7, and 9 students, between 2010 and early 2020. The principle regressors of interest were the five-part ABS location categories. We also controlled for additional variables likely to influence student achievements, such as school size (Lee, Lobe 2000), indigeneity and language background (Drew, Bernardelli, Kortt 2019). The index of socio-educational advantage (ICSEA) score could not be used with the latter two variables (because the index employs the variables, thus introducing unacceptable multicollinearity) and when used (without them) was interpreted with caution, because the location regressor is also part of the index (thus potentially confounding results). It was also important to control for school sector (public, catholic or independent) that is associated with socio-educational advantage (Drew, Bernardelli, Kortt 2019). In addition, we controlled for student-teacher ratio and student-support staff ratio that are often considered to be proxies for school resource quality (Drew, Kortt, Bec 2019). Recurrent funding for each particular school and capital expenditure funding were also controlled for in cognisance of prior research (Vidyattama, Li, Miranti 2018). We experimented with several models, including models run at the state level, and found our results robust to alternate specifications and regression techniques. We also ran regressions on the 2010 data and found that the sign and significance of the coefficients were largely unchanged.

The second set of regressions examined whether the complex funding formula, with what appears at times to be arbitrarily weighted loadings and deductions, result in appropriate *subsidium* responsive to the needs at various locations (our second objective). Given that most Commonwealth funding is not provided directly to individual schools (states allocate to their public schools, and regionally-based dioceses allocate to the Catholic schools under their control according to perceived need), it is unclear if intrastate variation in need is met consistently across the country. We therefore conducted a further two mixed-effects regressions. One employed total recurrent income per student for each particular school as the regressand (including parent contributions) and the other used the sum of state and Commonwealth funding for each particular school (which represents the *subsidium* component). Once again, the location categories were the main regressors of interest. Each model drew on variables such as indigeneity, non-English speaking background, school size and sector, which are well-recognised measures of education need to which the *subsidium* should be responsive, and are consistent with the extant literature (Drew, Kortt, Fahey 2019).

Our approach extends the two important examples of extant Australian work in a number of ways. First, we examine the outcomes for all available grades of students (Smith et al. (2019) was based on grade 5 and Vidyattama et al. (2018) only considered secondary school students). Second, we examine the spatial distribution of funding arising from the interplay between complex funding formulas, reallocations within jurisdictions and parent contributions that comes to salience when considering matters in light of the principle of subsidiarity. Third, we take advantage of a new more disaggregated spatial categorisation of remoteness available at the national level (hence the use of mixed effects regression which is optimal for assessing national spatial effects, given state-level hierarchy). When combined with the principle of subsidiarity our empirical work allows us to fully appreciate the importance of spatial distributions in education outcomes and funding.

Are there spatial variations in school education outcomes?

The 2017 data for Australia reveals a strong relationship between remoteness and student achievement as measured by the average z scores of the NAPLAN tests: with increasing remoteness, achievements drop (Table 1). On top are schools in major cities (the majority of schools in Australia) that are the only ones with a positive average score, and the score drops consistently with remoteness and dives in the very remote category, despite preferential

Table 1: Average NAPLAN test z scores by state and geographical remoteness, Australia, 2017
NAPLAN teszt Z-értékek szövetségi államok és földrajzi távolság szerint, Ausztrália, 2017

	Total	*Major cities*	*Inner regional*	*Outer regional*	*Remote*	*Very remote*
Number of schools[1]	9,333	5,107	2,249	1,408	297	272
Australia total	-0.018	0.320	-0.150	-0.373	-0.769	-2.609
Australian Capital Territory	0.234	0.247	-0.613[2]	none	none	none
New South Wales	0.126	0.405	-0.167	-0.483	-0.852	-1.156
Northern Territory	-2.460	none	none	-0.573	-1.864	-3.964
Queensland	-0.115	0.203	-0.207	-0.321	-0.642	-1.356
South Australia	-0.271	-0.018	-0.222	-0.552	-0.268	-3.644
Tasmania	-0.231	none	-0.054	-0.463	-0.303	-0.426[2]
Victoria	0.248	0.436	-0.059	-0.041	-0.208	none
Western Australia	-0.157	0.229	-0.333	-0.361	-0.671	-2.301

1 Excluding missing values. Combined schools were separated into elementary and secondary.
2 Based on less than 5 schools.
Source: authors' calculation

funding (see latter). Major cities in Victoria and NSW – Melbourne and Sydney – performed best, and the State of Victoria performed best in each remoteness category. The negative relationship between remoteness and test achievement is very strong in NSW, strong in West Australia, evident in Queensland and in the Northern Territories. When examining only Australia's schools with up to 10% Indigenous students (not shown) the average scores rise sharply. Major cities retain and even increase their advantage, but otherwise the impact of remoteness becomes rather modest.

Two mixed effects regressions were conducted to investigate whether the apparent impact of location on achievement is causal or merely the result of spatial variations in demographics and wealth (Daley, Wood, Chivers 2017). The prime explanatory variable influencing student achievement according to the 2017 model was the percentage of Indigenous students (Table 2). Being an independent school had a marked positive influence on scores compared to public schools, Catholic schools being in-between. School size also had a substantial positive effect on achievements and a host of other variables had the expected significance identified in previous studies: higher teaching and non-teaching staff per student, rate of participation in the NAPLAN test, and proportion of female students had a positive influence on test scores. Total income per student in the recurrent school budget had a positive impact on achievements whereas the impact of capital expenditures per student was positive but marginal.

As to the independent influence of geographical remoteness (Table 2), inner-regional schools did poorly relatively to major cities, beyond what could be expected by their other attributes. Schools in the very remote periphery also had lower achievements. Otherwise, for schools at the outer-regional and remote categories, lower achievements were mostly explained by other variables.

More than half of Australian schools are in major cities (52.2%). Only 6.7% of the schools are remote and very remote, and their share among students is much lower. Even if adding the outer regional areas, the proportion of schools in the periphery is only 22.9%. Hence, the big numbers in Australia are concentrated in a few large cities that on average do better than schools in the rest of the country, either because of an independent effect of location or because of their socioeconomic and other school attributes.

The 2017 regression with the Index of Community Socio-Educational Advantage (ICSEA), instead of the percentage of Indigenous students and of students from non-English speaking background (Table 2), revealed that ICSEA is a dominant explanatory factor of test achievement, diminishing and even reversing the impact of other factors. The advantage of independent schools disappears, apparently being a product of advantageous parent background, confirming that school sector is a crude proxy for socio-educational advantage. The coefficient for Catholic schools is even negative. The geographical remoteness variable, which should be treated with caution in this regression, mainly reveals disadvantage of very remote schools.

Table 2: Average NAPLAN test z scores, Australia, 2017
NAPLAN teszt Z-értékek, Ausztrália, 2017

	Model 1 (including % Indigenous and % non-English background)		*Model 2 (including ICSEA)*	
	β	*SE*	*β*	*SE*
Number of students[1]	0.287***	0.019	0.069***	0.014
Indigenous	-0.034***	0.001		
Non-English background	-0.001***	0.000		
ICSEA			0.008***	0.000
Catholic	0.179***	0.017	-0.112***	0.013
Independent	0.524***	0.024	-0.034	0.019
Inner regional	-0.203***	0.018	0.021	0.012
Outer regional	-0.046**	0.023	0.144***	0.000
Remote	0.099**	0.042	0.143***	0.030
Very remote	-0.259***	0.055	-0.324***	0.039
Female	0.005***	0.001	0.003***	0.000
Students/teacher	0.034***	0.004	0.007***	0.003
Students/non-teacher	0.004***	0.000	0.000	0.000
Participation rate	0.009***	0.001	0.004***	0.001
Total net recurrent income per student (1000s)	0.023***	0.002	0.004***	0.001
Total capital expenditure per student (1000s)	0.007***	0.002	-0.009	0.002
Additional controls	YES		YES	
Random-effects parameters	*Estimate*	*SE*	*Estimate*	*SE*
State: Unstructured				
σ(*constant*)	0.024	0.013	0.035	0.018
σ(residual)	0.358	0.005	0.187	0.003
Observations	9,249		9,175	

*** p<0.05, *** p<0.01.*
Note: All regressions control for type of school – whether it is a primary, secondary or combined campus.
1 Number of students divided by 1000.
Source: authors' calculation

The 2010 models (not shown) practically confirmed the 2017 results, except for the percentage of students from non-English speaking background and for capital expenditures per student that had no influence in 2010 and a weak influence in 2017. Different categories were provided for geographical remoteness, but results were similar: schools in provincial locations (the most central category after metropolitan) had markedly lower achievements, and achievements were also lower in very remote schools.

Hence, findings confirm that spatial variation in need is not merely a consequence of spatial variation in socio-demographics and wealth. Other factors – such as difficulty in attracting staff, commuting distance, after school commitments

and potential for post-school study – may be salient to at least some of the observed spatial variation in need. From the perspective of subsidiarity, such explanations suggest that the observed need may not be met purely by financial *subsidium* (for example, funding is unlikely to appreciably alter commute times). They seem to point to the need for a broader conception of subsidiarity, as all forms of support and kindness (Evans, Zimmermann 2014), which might yield more tailored solutions to the particular problems of remoteness: education public policy-makers located in the capital cities and Canberra may not have sufficient geographic proximity to understand the problems, let alone implement efficacious solutions.

Notwithstanding the need for *subsidium* that goes beyond fiscal considerations, and is thus also responsive to the particular problems engendered by remoteness, it is certainly the case that *subsidium* is at present focussed on monetary aid allocated according to a model developed by the Commonwealth and channelled via the states and various religious education intermediary bodies. We now turn our attention to investigating whether this fiscal *subsidium,* just like need, is spatially distributed.

Is the subsidium appropriate?

Financial data for schools in Australia for 2016 is consistent across states and territories (hence, tables for each state are not shown), indicating a nationwide school education policy, rather than substantial inter-state policy divergence. It reveals a clear correlation between remoteness and school recurrent income: total income per student, Commonwealth funding and, even more markedly, state funding steadily increase with remoteness (Table 3). The higher funding per student in more remote localities is a product of an explicit funding policy that considers needs, including remoteness, smaller school size and lower proportion of non-public schools. A positive correlation between capital expenditure and remoteness is less consistent. States give substantially more per student in the three more remote location categories, whereas schools in major cities and inner regional locations rely more on private sources, apparently because of a higher share of private schools. Capital expenditures per student are in fact higher in major cities than in any other location category (except for the rather few schools in very remote locations), funded largely by non-government sources. This may reflect greater needs in expanding metropolitan areas, underutilisation of assets in remote localities, greater ability to fund development through private sources in core areas, and greater managerial ability to materialize development projects in prosperous core locations.

Table 3: Schools financial data per student by geographical remoteness, Australia, 2016
Iskolák egy diákra számított pénzügyi adatai földrajzi távolság alapján, Ausztrália, 2016

	Total	*Major cities*	*Inner regional*	*Outer regional*	*Remote*	*Very remote*
Number of schools[1]	9,051	4,721	2,261	1,461	308	300
Total recurrent income per student	14,291.2	13,866	14,191.3	15,891.3	20,555.6	27,427.7
Recurrent income provided by Commonwealth per student	4,195.4	3,963.6	4,559.3	4,685.7	5,922.8	8,267.1
Recurrent income provided by state/territory per student	7,472.4	6,804.5	7,982.9	9,986.8	13,447.4	18,246.8
Total capital expenditure per student	1,137.8	1,197.4	942.0	997.5	837.5	2,483.3
Capital expenditure funded by Commonwealth per student	83.8	70.2	99.7	120.1	96.7	514.2
Capital expenditure funded by state/territory per student	337.5	318.5	308.7	425.0	515.9	1,503.4

1 Including missing financial data.
Source: ACARA dataset, Australian Bureau of Statistics

Data for 2009 revealed similar patterns. Whereas recurrent budgets per student increased between 2009 and 2016, capital expenditures were substantially higher in 2009, apparently because of spending on school infrastructure as part of the stimulus package implemented in response to the 2008 global crisis. The Australian government was the major funder of capital expenditures in 2009, but retreated by 2016 while state capital expenditures grew only marginally.

School finance varied considerably between the three school sectors (Table 4). Catholic schools enjoyed only a slight advantage over public schools in recurrent income per student, relying mainly on the support of the Commonwealth rather than of the states. Independent schools are diverse, but overall had much more resources per student than either public or Catholic schools, thanks to higher private funding (by parents, etc.). Commonwealth and state support was less than 50% of the recurrent income of independent schools and about 5% of their capital expenditures. Nevertheless, capital expenditures of independent schools per student were nearly double than in Catholic schools and nearly five times higher than in public schools.

The regional variable had limited influence on finance among independent schools. Commonwealth and state support were positively correlated with remoteness, but parents' participation worked at the other direction. Schools in major cities were richest, despite getting less public support, and their riches apparently came from tuition and other non-governmental sources (Table 4). Those in inner regional and outer regional localities were somewhat less

Table 4: Schools financial data per student by sector and geographical remoteness, Australia, 2016
Iskolák egy diákra számított pénzügyi adatai intézményfenntartó és földrajzi távolság alapján, Ausztrália, 2016

Government schools	*Total*	*Major cities*	*Inner regional*	*Outer regional*	*Remote*	*Very remote*
Number of schools	6,347	3,035	1,647	1,158	255	252
Total recurrent income per student	13,273.3	12,370.1	13,795.2	16,006.2	20,479.2	26,697.1
Recurrent income provided by government[1]	12,581.3	11,632.9	13,219.9	15,391.9	19,898.0	25,920.3
Total capital expenditure per student	588.4	570.8	518.3	662.1	674.5	2,212.7
Capital expenditure funded by government[1]	558.1	539.0	495.6	632.0	636.6	2,159.7
Catholic schools	*Total*	*Major cities*	*Inner regional*	*Outer regional*	*Remote*	*Very remote*
Number of schools	1,662	1,015	373	208	39	27
Total recurrent income per student	14,020.3	13,734.8	13,961.4	15,112.8	20,760	32,085.5
Recurrent income provided by government[1]	10,892.5	10,277.9	11,658.3	12,758.4	18,009.2	30,890.9
Total capital expenditure per student	1,548.1	1,558.3	1,455.0	1,674.2	1,157.9	3,089.0
Capital expenditure funded by government[1]	157.9	122.2	235.2	241.1	378.0	592.0

Independent schools	*Total*	*Major cities*	*Inner regional*	*Outer regional*	*Remote*	*Very remote*
Number of schools	1,042	671	241	95	14	21
Total recurrent income per student	18,884.8	19,399.8	16,599.5	16,591.7	20,987.6	33,693.8
Recurrent income provided by government[1]	8,797.2	8,190.4	10,400.5	12,199.4	16,253.0	30,598.3
Total capital expenditure per student	2,933.0	3,058.7	2,342.2	2,649.8	2,048.0	6,707.2
Capital expenditure funded by government[1]	172.4	140.0	225.1	416.5	901.0	1,682.4

1 Commonwealth and states/territories.
Source: ACARA dataset, Australian Bureau of Statistics

endowed. The very few independent schools in remote and very remote locations had high income per student thanks to very high public support, mainly of the Commonwealth, but also of the states, but suffered from small size. The high capital expenditures in independent schools were negatively correlated with remoteness (except for very remote schools). Commonwealth support for remote schools was offset by greater private/parent participation in central locations. Similar, although less marked, trends were observed among the less affluent Catholic schools.

This data suggest that funding consistently varies in a spatial sense despite the multitude of allocating bodies of Commonwealth resources. The principle of subsidiarity would suggest that spatially differentiated funding is in line with the spatially differentiated need observed earlier. However, it is important to ascertain whether the apparent variation in funding is the result of significant efforts to address spatial need, or mostly a consequence of the spatial distribution of students (for example Indigenous children) who attract a loading under the SRS funding model. To answer this question, we conducted an additional two mixed effects models.

Regressions on parameters of school finance (Tables 5-6) verify trends identified in the crosstabulations (Tables 3-4). A major explanatory variable of total net recurrent revenues per student in 2016 was school size: the larger the school the smaller the income/expenditure per student, indicating economies of scale (Model 1 in Table 5). School type also had a major influence: secondary schools spend more per student than primary schools (not shown in the tables), because of different SRS public funding levels for primary and secondary schools. Income per student grew with the percent of Indigenous students. Independent

schools were better endowed in terms of recurrent revenues per capita. The geographical remoteness variable remained prominent in the multivariate model: income per student markedly increased with growing remoteness.

Total government grants per student (combined Commonwealth and state support) were higher in small schools, public schools, secondary schools, schools with a high proportion of Indigenous students and schools located at the three more remote geographical categories: outer regional, remote and very remote (Model 2 in Table 5). Large schools, private schools, primary schools and schools in major cities received the lowest grants per student. Expectedly, given the lumpy nature of capital expenditure and the uneven growth patterns in Australia, patterns of capital spending per student were less consistent and the models had less explanatory power (not shown). Capital investment was highest in private schools and somewhat higher in schools with a high proportion of Indigenous students and in very remote schools.

Table 5: Net recurrent income per student, Australia, 2016
Egy diákra jutó nettó rendszeres bevétel, Ausztrália, 2016

	Model 1 (*Total net recurrent income*)		*Model 2* (*Commonwealth and state government recurrent income*)	
	β	*SE*	*β*	*SE*
Number of students[1]	-0.262***	0.010	-0.413***	0.011
Indigenous	0.004***	0.0002	0.004***	0.0003
Non-English background	-0.0002	0.0001	0.0009***	0.0002
Catholic	-0.005	0.008	-0.112***	0.008
Independent	0.148***	0.012	-0.320***	0.013
Inner regional	0.071***	0.008	0.141***	0.009
Outer regional	0.244***	0.010	0.319***	0.011
Remote	0.468***	0.018	0.522***	0.019
Very remote	0.594***	0.023	0.603***	0.024
Additional controls	YES		YES	
Random-effects parameters	*Estimate*	*SE*	*Estimate*	*SE*
State: Unstructured				
σ(*constant*)	0.010	0.005	0.015	0.008
σ(residual)	0.073	0.001	0.084	0.001
Observations	8,901		8,901	

*** p<0.05, **** p<0.01.*
Note: All regressions control for type of school – whether it is a primary, secondary or combined campus.
1 Number of students divided by 1000.
Source: authors' calculation

Results for 2009 (not shown) were largely similar, with one notable difference: in 2009, recurrent income per student was much lower in Catholic schools and somewhat lower in independent schools than in public ones whereas in 2017 the reverse was truer and independent schools enjoyed an advantage. This was largely due to far lower government transfers provided to independent and Catholic schools in 2009. The geographical variable mainly indicated lower government funding to schools in major cities (the metropolitan category). Inclusion of the Index of Community Socio-Educational Advantage (ICSEA) in the 2016 models, instead of the percentage of Indigenous students and of students from non-English speaking background, did not substantially influence results (Table 6). ICSEA took the place of the percentage of Indigenous students, but the change had marginal impact on other explanatory variables.

Table 6: Net recurrent income per student (including[1] CSEA)[1], Australia, 2016
Egy diákra jutó nettó rendszeres bevétel
(a Közösségi Társadalmi-Oktatási Előny Mutató figyelembevételével), Ausztrália, 2016

	Model 1 *(Total net recurrent income)*		*Model 2* *(Commonwealth and state government recurrent income)*	
	β	*SE*	*β*	*SE*
Number of students[2]	-0.228***	0.010	-0.346***	0.010
ICSEA	-0.0007***	0.000	-0.0013***	0.000
Catholic	0.024***	0.007	-0.053***	0.007
Independent	0.178***	0.012	-0.239***	0.012
Inner regional	0.059***	0.007	0.073***	0.007
Outer regional	0.229***	0.009	0.240***	0.009
Remote	0.444***	0.017	0.443***	0.017
Very remote	0.587***	0.021	0.517***	0.021
Additional controls	YES		YES	
Random-effects parameters	*Estimate*	*SE*	*Estimate*	*SE*
State: Unstructured				
σ(*constant*)	0.009	0.004	0.014	0.007
σ(residual)	0.065	0.001	0.064	0.001
Observations	8,670		8,670	

*** p<0.05, *** p<0.01.*
1 These models include ICSEA as an explanatory variable, hence excluding % Indigenous and % non-English background students.
2 Number of students divided by 1000.
Source: authors' calculation

The persistence of spatial variation in funding, despite controlling for variables that represent need, suggests that the SRS model is responsive to spatial need and not merely to the spatial distribution of needy students. It is noteworthy that the SRS objectives have been met despite the funding being passed through various intermediary bodies such as state governments and Catholic dioceses, which sometimes re-distribute according to their own objectives. This suggests that it might be possible to have greater decentralisation in education decision-making, consistent with the principle of subsidiarity, without exacerbating differences owing to unequal fiscal capacity. This principle asserts that greater associations (such as the Commonwealth and state governments) have a moral responsibility to meet *bona fide* need. Hence, because outcomes still varied spatially we can assume that either the fiscal *subsidium* was insufficient to meet need or that the need cannot be mitigated solely through spatially responsive funding.

Conclusions

Australian centralized federalism is evident also in school education. Constitutionally, education is assigned to the states (and territories), excluding local governments. However, the Commonwealth has become increasingly involved in school funding and tied regulation, particularly with respect to independent schools. Centralization has indeed been mitigated, retaining an element of subsidiarity in the system, by enabling a large and growing segment of diverse (mainly faith based) private schools that receive substantial public funding. Publicly funded private education is a contentious issue worldwide, but its critique in Australia is mitigated by substantial regulatory measures at the Commonwealth level: policies such as the nationwide School Resource Standard (SRS) that specifies criteria for public allocations, the national Australian curriculum and nationwide achievement examinations.

Our study confirms the successful implementation of a consistent spatial redistributive policy in Australia's school system. Vertical fiscal imbalance, complemented by ambitious horizontal fiscal equalization, has enabled consistent fiscal redistribution, despite the variety of intermediary bodies and the plurality of private providers, in addition to the states, and a complex path-dependent division of regulatory and funding powers between the states and the Commonwealth. However, the redistributive action has only been partly successful in mitigating spatial achievement gaps. We ascertained an intra-state variation in achievements that was not explained merely by the spatial distribution of demographics and wealth. Redistributive policy was successful in eliminating much of the autonomous impact of remoteness on school achievements, but not for schools in inner regional and very remote locations.

The former, just beyond major city-regions, may not receive full compensation for their less central location compared to major cities. Redistribution focuses on the more remote location categories whose disadvantage is so substantial that it might not be fully compensated by the very high support received.

The education landscape in Australia is consistent with the principle of subsidiarity in terms of the assignment of responsibility to parents and caregivers through the plurality of associations endorsed to provide formal education instruction. However, where the Australian educational landscape differs significantly to the prescriptions associated with the principle is in the constitutional assignment of powers to the states, due to both historical antecedents and the fiscal weakness of Australian local governments.

Does the persistence of a net negative effect of remoteness on educational achievement, despite a redistributive policy that functions rather coherently in a plural context, justify calls for greater decentralization of education to the local government level? An assessment of such a step is beyond the scope of the present study. Decentralization to the local level might produce better tailored solutions that enhance accountability, transparency and responsiveness to particular problems of more remote locations, but it could also exacerbate regional inequality. Nevertheless, our analyses demonstrated a high level of spatially responsive funding that was applied in a consistent manner despite the multitude of school administration bodies. The consistency, achieved through co-operation between the respective Commonwealth and state governments, suggests that it could be possible to pursue policies of greater levels of decentralization, arguably more consistent with subsidiarity, without exacerbating regional inequality. The inability of fiscal *subsidium*, whilst responsive to spatial needs, to equally meet diverse needs might reinforce the argument derived from subsidiarity for policies of even greater decentralisation in administration that might be better positioned to provide innovative non-pecuniary support required for persons to meet their existential ends.

Although Australia does not seem to explicitly aspire for exemplary best practice policies, this case study provides insights for handling school education gaps elsewhere. It suggests policies of maintaining plurality while minimizing gaps through redistribution and opting for nationwide monitoring of curriculum and achievements, specifically to cope with public versus private education. It shows the merits of centralized federalism, coupled with vertical fiscal imbalance and horizontal fiscal equalisation. Spatially it demonstrates the limits of what money can buy for the remote periphery, and the challenge of the semi-periphery (inner-regional Australia), where minor redistribution is insufficient to address geographical inferiority.

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Appendix: Definitions and means of variables
Függelék: A változók definíciói és középértékei

Variable	*Definition*	*Mean*
Number of students	Number of FTE students enrolled at the school, divided by 1,000.	0.449
Indigenous	Percentage of students identifying as Aboriginal and or Torres Strait Islander	10.2
Non-English background	Percentage of students who speak a language other than English at home.	21.4
ICSEA	Index of Community Socio-Educational Advantage	1,000.9
Government	Schools administered by state or territory authorities (excluding special schools)	6,004
Catholic	Dummy variable for schools administered by dioceses or individual Catholic institutions	1,722
Independent	Dummy variable for schools which are neither government nor Catholic	1,537
Primary	Elementary schools.	5,548
Secondary	Dummy variable for secondary schools. In all states other than South Australia (year 8) secondary schooling commences in year 7.	1,326
Combined	Dummy variable for campuses offering both elementary and secondary schooling.	2,389
Major cites	Based on ARIA+ index which measures road distance to nearest urban center; ARIA+ 0 to 0.2	5,066
Inner regional	Dummy variable; ARIA+ 0.2 to 2.4	2,224
Outer regional	Dummy variable; ARIA + 2.4 to 5.92	1,408
Remote	Dummy variable; ARIA+ 5.92 to 10.3	297
Very remote	Dummy variable; Greater than 10.53	268
Female	Percentage of female students	48.997
Students/teacher	Number of students per FTE teacher	13.607
Students/non-teacher	Number of students per FTE non-teaching staff	42.760
Participation rate	Percentage of students who participated in the NAPLAN test	93.8
NAPLAN achievement	Average of mean z scores of the reading, writing, spelling, grammar and numeracy exams	0
Total net recurrent income per student	Nett annual recurrent income of school, divided by the number of students.	17,015.66
Total capital expenditure per student	Annual capital expenditure of school, divided by the number of students.	1,117.76

Source: ACARA dataset, Australian Bureau of Statistics