Education Finance in Egypt: Problems and a Possible Solution

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Abstract

Egypt, currently in the throes of major political change, will likely undergo reforms of various sorts in the next few years. Some of these reforms are likely to give local entities, including schools, greater control over education finances. In 2007, the Government of Egypt began to decentralize some non-personnel recurrent finances from the center—the Ministry of Education and the Ministry of Finance (MOF)—to lower-level jurisdictions, including schools, using a number of simple and transparent enrollment- and poverty-based funding formulas. By 2010, a sizable amount of capital expenditure was also being transferred to lower levels of the system via similar equity-based funding formulas. Prior to these formula-based decentralization efforts, a large amount of education-related non-personnel recurrent finances had already been moving from the MOF to the *muderiyat*, education offices at the governorate level of the system. Analysis of these latter allocations reveals that they are highly inequitable on an inter-governorate per-student basis, ranging from EGP 966 per student in New Valley to EGP 25 per student in 6th of October. This paper examines the nature and potential causes of this inequity and espouses a way in which these funds could be transferred using an equity-based funding formula that holds harmless those muderiyat that would lose absolute amounts of money under such a more equitable distribution scheme.

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Background and Problem Statement

Unrelated to the current political changes brought on by the Arab Spring movements, Egypt had started to make a number of significant strides in the use of enrollment- and poverty-based funding formulas. As shown in Table 1, increasing amounts of money had been transferred to lower levels of the system, with EGP 8.46 million[1] being decentralized to three pilot *muderiyat*[2] in 2008/09, and EGP 575 million being decentralized nationwide in 2011/12 following

similar equity-based principles.[3] We evaluated each of these occasions in which government funds were passed down to lower levels of the system. The overwhelming response to the effort was positive among all the key stakeholders surveyed: parental members of the Boards of Trustees, principals, Idara Heads, and Muderiya Heads (Healey, Hana, & Atalla, 2012a, 2012b; Healey, Crouch, & Hana, 2009, 2010).

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[1] EGP: Egyptian pound. EGP 1 = $0.17 at the time of the analysis

[2] *Muderiyat* (plural form of *muderiya*) are governorate-level education departments. The governorate is the first subnational level, similar to states or provinces in other countries—but noting that Egypt is not a federal country.

[3] Egypt's governmental financial accounting separates finances according to BABs, which are "chapters" or, literally, "gates." BAB2 refers to non-personnel recurrent expenditure, including both minor and major maintenance. BAB6 refers to capital expenditures.

Table 1. Recent enrollment- and poverty-based funding formula efforts in Egypt

Fiscal Year	Type of money transferred	Amount (EGP)	Pathway
2008/09	MOE's non-personnel BAB2	8.46M	Money went directly from the MOE to all schools in the pilot muderiyat of Fayoum, Ismailia, and Luxor.
2009/10	MOE's BAB2	10.1M	Money went directly from the MOE to all schools in the pilot muderiyat of Fayoum, Ismailia, and Luxor.
2010/11	GAEB's BAB2 for Maintenance	210M	Money went directly from the MOF to every muderiya in the country. 105M eventually went to government schools nationwide for minor maintenance; 105M stayed at the muderiya to address major maintenance needs of some schools (an amount too difficult to distribute by formula).
	MOE's BAB2 for One Classroom Schools, Technical Schools, and Nutrition	15.17M	Money went directly from the MOF to every muderiya in the country. 5M went to every Technical School nationwide; 4M went to every One Classroom school nationwide; and 6.17M stayed at the muderiya to support their respective nutrition programs.
	MOE's BAB6 for Technical Schools' Operations and Technical Education Reform	224M	Money went directly from the investment bank to every muderiya in the country. The muderiyat developed plans to improve the overall condition of those technical schools most in need.
2011/12	GAEB's BAB2 for Maintenance	210M	Same as 2010/11
	MOE's BAB2 for One Classroom Schools, Technical Schools, and Nutrition	15.17M	Same as 2010/11
	MOE's BAB6 for Technical Schools' Operations and Technical Education Reform	350M	Same as 2010/11

BAB2 = recurrent expenditures; BAB6 = capital expenditures; GAEB = General Authority for Education Buildings; MOE = Ministry of Education; MOF = Ministry of Finance.
Source: Created by the authors on the basis of key Government of Egypt memoranda and policy documents.

These efforts have been characterized by several features that, in the Egyptian context, are quite innovative. These features, described below, allow the allocation of this expenditure to be called "decentralized."[4] First, the funding is allocated to lower levels of the system via simple and transparent equity-based funding formulas. Accordingly, all actors can know how much is being allocated to themselves, to others, and why. Moreover, because the allocation is done by such a funding formula, it minimizes budgetary transaction costs and obviates a long-standing negotiation practice that has resulted in grossly inequitable per-student allocations across governorates.

Second, the decentralized education finance approach that has been unfolding since 2007 allocates money in such a way as to allow the recipients some discretion in how to use the money: what to purchase, when, and from whom. However, it must be noted that these processes are not yet ideal in that, for instance, in the BAB6 allocations there are certain restrictions on the use of the funding—a large percentage can be used only for technical schools.[5] Nevertheless, it is a meaningful beginning toward what many would refer to as decentralized education finance (Hill & Bonan, 1991; Ross & Levacic, 1999; Kim, 2008; Uyttersprott, 2008; Healey & Crouch, 2012).

While this paper does not focus on advocating for decentralization, or examining its pros and cons in any detail, it does take two claims as its point of departure: (1) that decentralization is an existing trend in many countries and is a policy option that many international agencies urge countries to at least consider (Smoke, 2000, 2001; Basher, 2003; Busemeyer 2012; Ahmad, Brosio, & Tanzi, 2005), and that (2) if a country is likely to embark upon

some form of decentralization, the design of the mechanisms for decentralization ought to take into account their efficiency and equity impacts (Monk, 1990; Augenblick, Meyers, & Anderson, 1997; Roza & Miles, 2002; Sharma, 2005; Kim, 2008; Odden & Picus, 2008; Ahmad & Brosio, 2009; Healey & Crouch, 2012). On the assumption that post-reform Egypt will continue decentralization efforts, an analysis of past modalities of transferring funds (particularly in terms of equity) is timely and justified.

The efforts carried out so far, as detailed in Table 1, used equity-based formulas, as is generally recommended in the literature (Monk, 1990; Berne & Steifel, 1994; Odden & Busch, 1998; Ladd, Chalk, & Hansen, 1999; Roza & Miles, 2002; Paqueo, Lopez-Acevedo, & Parandekar, 2003). Depending on whose advice future Egyptian authorities seek and heed, it is possible that the authorities would attempt to continue with some form of equity-oriented formula. But a major problem with decentralizing *existing* funds via an equity-based formula is this: If, in the past, the funding was distributed without a strong *implicit* formula or some other rationale acceptable in the public discourse of a democratizing nation, and if it was highly inequitable in per capita terms across governorates, then introducing a formula that provides funding on a conventionally rational and more equitable basis can produce strong winners and losers.

While the winners would be quite pleased with the situation, the losers would probably not be, and they would likely tether their misfortune not to the fact that they have been opaquely privileged in the past but to the introduction of decentralization and formula-based funding. This could give decentralization and formula funding a bad name and so make the overall effort that much more difficult to implement, when in fact decentralization and formula-based funding have many positive aspects (e.g., horizontal accountability, customer satisfaction, equity, transparency, predictability, low transactions costs).

There are of course many pros and cons to decentralization. The literature on this issue is vast (Rondinelli, Nellis, & Cheema, 1983; Hannaway &

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[4]   Movement of government resources from the center to a subnational level of the system does not, in and of itself, constitute what the literature would refer to as decentralized finance (Hill & Bonan, 1991; Ross & Levacic, 1999; Kim, 2008; Uyttersprott, 2008; Healey & Crouch, 2012).

[5]   Also, when the BAB2 allocation went nationwide, the maintenance line item of EGP 210M from the General Authority for Education Buildings (GAEB) was used. The procurement law requires that this maintenance money cannot be transferred between line items, but schools can choose from among a very large list of minor maintenance activities. While far from perfect, this approach does give schools some element of choice over an issue—minor maintenance—on which they are best-informed and thus can make swift and information-based decisions.

Carnoy, 1993; Naidoo, 2002; Faguet, 2004; Ahmad, Devarajan, Khemani, & Shah, 2005; De Grauwe et al., 2005; Sharma, 2005; Winkler, 2005; Kim, 2008; Ahmad & Brosio, 2009; Healey & Crouch, 2012). A summary of the pros and cons is beyond the scope of this paper. The paper assumes, instead, that countries embark on decentralization for many very complex reasons, not all of them necessarily "rational" from a "modernist" or technocratic point of view. The paper assumes, nonetheless, along with the literature, that once a decentralization path is chosen, the mechanisms for doing so should attempt to maximize equity and efficiency (Rondinelli et al., 1983; Hill & Bonan, 1991; Litvack, Ahmad, & Bird, 1998; Welsh & McGinn, 1999; Winkler, 2005; Kim, 2008; Healey & Crouch, 2012).

One particular feature of the decentralized education finance process that has unfolded thus far, which has made it relatively easy to introduce, is the fact that the resources that have been transferred to the subnational units of the education system were traditionally allocated directly to the center, either to the central MOE, or *Diwan*, or to the General Authority for Education Buildings (GAEB) at the national level. Once there, these funds were generally spent by the Diwan/GAEB *on behalf of* the subnational units, purchasing goods and services and then transferring those goods to, and carrying out those services in, the subnational units. This means that the subnational units had very little perception of the cash value of what they were getting, much less the per-student values of those goods and services. Moreover, in some cases the funding represented temporary efforts to boost spending in a particular subsector of the education system (e.g., technical education reform). Given these two factors, equity-based formula funding has been relatively easy to introduce, in that, because it is perceived as "new" money, it has not created any strong sense of winners and losers among the subnational units.[6] That the funding appears as fresh money that has been equitably distributed decreases a sense of winners and losers and thus provides an ideal way to demonstrate

how one can transfer resources as cash *and* according to an equity-oriented formula.

However, the amount of non-personnel recurrent money that is shown in Table 1 to have been decentralized via an equity-based funding formula is a small portion of the total amount of BAB2 resources that subnational units—in particular, the muderiyat—have been receiving each year. Table 2 shows that the muderiyat have been getting approximately 40 percent of the total amount of BAB2 directly from the MOF. Though the table does not show it, this has been the case for quite some time.[7]

Table 2. Shares of key expenditure categories by level of government (fiscal year 2009/10)

Level	BAB2 Amount (EGP)	BAB2 Share (%)	BAB6 Amount (EGP)	BAB6 Share (%)
Center	1,568,004,000	54	1,672,517,000	88
Muderiyat	1,207,463,000	42	224,000,000	12
Schools	120,170,000	4	NA	—
Total	2,895,637,000	100	1,896,517,000	100

BAB2 = recurrent expenditures; BAB6 = capital expenditures; NA = not applicable.
Source: Created by the authors on the basis of key Government of Egypt memoranda and policy documents.

The problem here is that the particular subset of BAB2 resources that this table refers to has largely been allocated on the basis of history, negotiation, and a number of heretofore unknown factors that have resulted in a highly inequitable inter-governorate per-student allocation, as shown in Table 3. Given the size of this inequity, the introduction of an equity-based funding formula would surely produce considerable winners and losers. When the losers become aware of the change, they would then tend to blame the formula funding itself. This would be unfortunate, as any likely publicly transparent formula is likely to be an equity and efficiency improvement over past ad hoc allocations. (Ad hoc allocations, of course, have a political-economic or at least a bureaucratic-inertia logic and in that sense may be "rational." But they are not rational in a manner that is easy to publicly

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6   However, there have been clear losers in the center, in particular, those units whose funds have been transferred to lower levels of government as part of decentralization. These units naturally would tend to resist a reduction in their power to make important financial decisions.

7   The authors know this from discussions with key people in the Government of Egypt, people who know how the budgeting and financing processes have worked.

defend in a democratizing situation.) Thus, if there is a possibility that Egypt will deepen decentralization efforts in the future and is likely to try to decentralize finances using an equity-based funding formula, it is important to explore the extent and nature of the inequities in funding and to propose a way in which these funds can be more equitably distributed without causing much undue political fallout.

The remainder of this paper attempts to carry out the above tasks in several steps. The first step is to evaluate whether there is an *implicit* formula (or set of formulas) underlying current allocations, and whether that implicit formula, if made explicit, would likely fulfill the transparency and accountability needs of a democratizing situation. This step consists of two aspects. The first is to correlate the spending levels, by muderiya, with as many possible policy motivations as seems reasonable to see whether the correlations have implicit patterns. The second aspect is to interview key informants to assess whether they are even aware of inter-muderiya differences in per capita allocations and, if so, whether they can articulate the rationale for the differences.

A second step is to determine whether the allocations, if inequitable, are somewhat stable over time. If so, expectations are likely to have emerged that they will continue, thus rendering a reform toward equity and efficiency more difficult. The third and final step is—if no implicit formula is discovered in the current allocations, or if the implicit formula is likely unacceptable in a democratizing situation (e.g., if the funding is implicitly pro-rich)—to propose a formula and a means to introduce the formula that would minimize the political fallout by protecting the losers to the degree possible.

The Extent of the Inequity Problem

As noted, the first step in the analysis is to show that there is an inequity in the allocations and then to try to see whether that inequity responds to some implicit formula that could survive public scrutiny in a decentralization situation. This section starts the process by documenting the inequity issue.

The extent of the inequity problem raised in the Introduction is shown in Table 3 (following page) in the column labeled *Total BAB2/student,* which shows the per-student values of the BAB2 funding that were already being channeled to the muderiyat directly from MOF. Those values range from EGP 966 per student in New Valley to EGP 25 per student in 6th of October. This is an enormous gap, higher than that which prevailed, for instance, in South Africa, in the difference between African and white schools, toward the end of apartheid. It is difficult to think of a rationale that could possibly account for the fact that some muderiyat get upwards of over *38 times* more money, on a per-student basis, than others. But there may be a certain rationale that could explain at least part of the difference.

The Tilt Toward "Remote" Governorates

Having established the fact of inequity, it then makes sense to try to understand whether the inequity follows some kind of logic that, in a transition toward a reformist Egypt, could withstand public scrutiny. It becomes apparent that the inequity tends to favor what Egypt classifies as the "remote" governorates—those that are distant from Cairo. This became even more evident when we looked at the line item labeled *Allowances for Personnel Working in Remote Areas* and observed how large that line item was, where that money was going, and how well the per-student values for these allowances correlated with the per-student allocations for the whole of BAB2 ($r = 0.975$).[8] When these allowances were factored out of the overall per-student calculations, the spread between highest and lowest per-student values dropped from EGP 966–EGP 25 to EGP 243–EGP 24—a drop of nearly 4 to 1. Clearly, this one line item helps to account for *and* explain a good bit of the inequity shown in Table 3, because it makes sense that remote governorates should receive incentive money to attract staff members to work there. The "weight" given to remoteness might thus be publicly defensible if it were included in a transparent formula.

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[8]   This correlation is calculated and asserted not as a partial or weak step in attributing causality but as a shorthand way of simply saying that the two are measuring essentially the same thing: the two variables convey basically the same information.

Table 3. Breakdown of BAB2 finances by governorate

Governorate	Total BAB2 (EGP)	Governorate employee allowances for remote areas (EGP)	BAB2 without remote allowances (EGP)	Nutrition (EGP)	Nutrition/student (EGP)	BAB2 without allowances and nutrition (EGP)	Public enrollment	Total BAB2/student (EGP)	BAB2 without allowances/student (EGP)	BAB2 without allowances and nutrition/student (EGP)	GDP per capita (EGP)
6th of October	12,984,000	600,000	12,384,000	5,615,000	9.43	6,769,000	523,188	25	24	13	5,552
Alexandria	38,145,000	8,000,000	30,145,000	8,784,000	9.81	21,361,000	720,456	53	42	30	5,840
Assiut	55,282,000	23,980,000	31,302,000	18,092,000	22.22	13,210,000	782,210	71	40	17	5,420
Aswan	10,478,000	65,732,000	34,755,000	24,470,000	90.38	10,285,000	247,635	406	140	42	6,053
Bani Suef	38,622,000	0	38,622,000	25,819,000	45.71	12,803,000	566,962	68	68	23	7,043
Beheira	38,276,000	130,000	38,146,000	16,626,000	16.17	21,520,000	1,006,660	38	38	21	8,396
Cairo	52,010,000	0	52,010,000	17,113,000	12.34	34,987,000	980,896	53	53	36	6,157
Dakahlia	37,975,000	0	37,975,000	11,650,000	11.10	26,325,000	1,011,325	38	38	26	6,769
Damietta	20,578,000	0	20,578,000	12,787,000	49.44	7,791,000	247,477	83	83	31	6,652
Fayoum	32,050,000	0	32,050,000	21,635,000	37.24	10,415,000	559,451	57	57	19	5,706
Gharbia	22,981,000	0	22,981,000	7,095,000	8.95	15,886,000	758,869	30	30	21	7,072
Giza	23,323,000	0	23,323,000	9,000,000	13.10	14,323,000	485,647	48	48	29	5,552
Helwan	10,416,000	0	10,416,00	3,000,000	7.10	7,416,000	350,576	30	30	21	6,157
Ismailia	13,339,000	225,000	13,114,000	5,988,000	27.40	7,126,000	206,759	65	63	34	6,752
Kafr el-Sheikh	17,419,000	0	17,419,000	5,423,000	10.21	11,996,000	527,748	33	33	23	6,270
Luxor	23,958,000	18,574,000	5,384,000	2,488,000	24.33	2,896,000	96,208	249	56	30	5,382
Mattrouh	24,095,000	8,200,000	15,895,000	12,562,000	154.88	3,333,000	78,867	306	202	42	6,329
Menofia	34,347,000	5,000	34,342,000	17,060,000	23.66	17,282,000	693,825	50	49	25	6,799
Minia	44,754,000	0	44,754,000	27,035,000	26.38	17,719,000	973,518	46	46	18	6,823
New Valley	43,745,000	33,500,000	10,245,000	7,069,000	156.09	3,176,000	45,289	966	226	70	7,358
North Sinai	23,423,000	8,000,000	15,423,000	9,700,000	116.91	5,723,000	81,011	289	190	71	5,668
Port Said	10,078,000	0	10,078,000	5,927,000	51.44	4,151,000	104,927	96	96	40	6,823
Qalubia	31,700,000	0	31,700,000	15,343,000	16.24	16,357,000	880,748	36	36	19	6,154
Qena	150,380,00	123,480,000	26,900,000	13,277,000	19.19	13,623,000	683,370	220	39	20	5,543
Red Sea	30,162,000	20,700,000	9,462,000	6,762,000	123.36	2,700,000	50,579	596	187	53	6,583
Sharqia	59,837,000	0	59,837,000	19,175,000	16.79	40,662,000	1,117,204	54	54	36	6,614
South Sinai	6,922,000	3,000,000	3,922,000	2,128,000	127.47	1,794,000	16,152	429	243	111	5,668
Suez	6,524,000	0	6,524,000	2,265,000	17.23	4,259,000	118,438	55	55	36	6,254
Suhag	98,660,000	64,326,000	34,334,000	21,500,000	25.27	12,834,000	824,249	120	42	16	5,370
Weighted average								75	49	25	6,378
Standard deviation (weighted)								88.7	27.1	21.4	736.3
Average deviation (weighted)								47.1	14.4	11.9	619.2
Coefficient of variation 1								1.2	0.6	0.6	0.1
Coefficient of variation 2								0.6	0.3	0.3	0.1
Correlation of BAB2 per student, BAB2 minus allowances per student, and BAB2 minus allowances and nutrition per student with GDP per capita								0.07	0.04	-0.02	
Correlation of BAB2 per student, allowances per student, and nutrition expenditure per student with GDP per capita								0.07	0.07	0.06	

Source: Created by the authors from budgetary records of the Government of Egypt.

Nevertheless, a large amount of inequity remains, by a factor of 10 to 1 EGP per student from most-financed to least-financed governorates.

The Nutrition Line Item

Might the remaining inequity also be publicly defensible? Another large line item that correlates fairly well with per-student allocations for the whole of BAB2 ($r = 0.717$) and that can account for a good bit of the inequity shown in Table 3 is *Nutrition.* When we took both the remote allowances and the nutrition line items out of the per-student calculations, the spread between highest and lowest per-student BAB2 allocation dropped to EGP 111–EGP 13. But while the nutrition line item can help to account for a good bit of the inequity found in Table 3 in a purely correlational sense, it is not clear how well it can explain it in a more causal sense.

While the unit cost of the nutrition program will certainly be higher in the remote governorates than it is in the non-remote governorates, it is difficult to understand how a governorate such as New Valley should have been getting over *17 times more* nutrition money per student than Gharbia, purely because of unit cost differences. Moreover, there are a number of anomalies, such as the nutrition per student values for Bani Suef and Qena. Why would the former, a non-remote governorate, get 2.4 times more for nutrition per student than the latter, which is a remote governorate? Could it be that these allocations (and allocations in general) were in some way factoring in poverty?

The Impact of Poverty

A look at the summary data provided at the bottom of Table 3 may help shed some light on this issue. Shown are the mean, or average, expenditure, as well as the two coefficients of variation (deviation divided by the average) for some of these factors. The standard deviation tends to exaggerate the bigger deviations (because it is the average of the square of the differences from any case to the mean), whereas the average deviation shows how much each case deviates from the average. Thus, average expenditure, after

taking out the remote allowances, is about EGP 49 per student, but the average deviation from that average is a fairly large EGP 14.

Several factors stand out. First, the variation in expenditure is much higher—perhaps by a factor of 6—than the variation in GDP per capita. This might be justified, to some extent, if the variation in expenditure were compensating for poverty, thus giving more money to the poorer governorates. But this is not the case. The table shows in the last two rows the correlation between expenditure and GDP per capita, which is essentially zero—around 0.05 or thereabouts. The first correlation expenditure row shows the correlation between each coefficient and GDP per capita—that is, the correlation of total BAB2 per student, BAB2 without allowances (per student), and BAB2 without allowances and nutrition (per student) with GDP per capita. The second correlation expenditure row shows the correlation between the expenditure on each given item—that is, BAB2 per student, allowances per student, and nutrition per student—and GDP per capita. In short, expenditure neither exacerbates nor compensates for poverty, at least as measured by the GDP per capita. Thus, poverty is not a meaningful implicit factor in these non-formula allocations.

The Impact of Population Density

We also considered the extent to which population density could account for the inequity shown in Table 3. The data in Table 4 show the relationship between population density and the BAB2 per-student allocations. While the *very most* sparsely populated governorates (the top 5 or so) tended to get the highest BAB2 allocations per student, the overall correlation between population density and BAB2 per-student allocation is very low (-0.142 [not shown]). Moreover, it is important to decompose the budget in an attempt to identify the factors that can account for the higher per-student allocations and to see whether these factors typically apply *only* to the most sparsely populated governorates. Again, the interest here is to see how much apparent publicly defensible rationality there might be in the allocation.

Table 4. Population density as a factor in unequal allocations

Governorate	Population density	BAB2 per student (EGP)
New Valley	1	966
Red Sea	1	596
Mattrouh	2	306
South Sinai	5	429
North Sinai	12	289
6th of October*	14	25
Suez	29	55
Aswan	34	406
Helwan*	43	30
Giza	74	48
Minia	129	46
Assiut	133	71
Beheira	468	38
Ismailia	654	65
Kafr el-Sheikh	762	33
Sharqia	1,278	54
Fayoum	1,375	57
Dakahlia	1,436	38
Alexandria	1,534	53
Qena	1,622	220
Bani Suef	1,733	68
Damietta	1,855	83
Gharbia	2,065	30
Menofia	2,135	50
Suhag	2,422	120
Qalubia	4,233	36
Port Said	7,927	96
Luxor	8,206	249
Cairo	36,386	53

* The population density figures for 6th of October and Helwan are estimates.
Source: Created by the authors from population and budgetary records of the Government of Egypt.

Table 5 shows the per-student allocations of some line items that appear to correlate with population density. As one can see, there is generally not much correlation *within* the non-dense governorates for at least some of these items, so it is clear that they are not driven by any clear formula that accounts for population sparseness. For example, Mattrouh stands out as having small transportation costs in spite of being very sparsely populated. Nutrition expenditure appears to have been higher in the sparsely populated

governorates, but then Damietta and Bani Suef, which are not sparsely populated, seem to have received relatively high nutrition allocations as well. And while the remoteness allowances correlate with sparseness, there are some very interesting outliers such as 6th of October and Luxor. And so, there still

Table 5. Specific per-student allocations compared with population density

Governorate	Population density	BAB2 per student (EGP)	Total transport-related costs (EGP)	Staff-related transport (EGP)	Remoteness/rurality staff supplement (EGP)
New Valley	0	156	18	14	740
Red Sea	1	134	15	11	409
Mattrouh	2	159	8	6	104
South Sinai	5	132	38	23	186
North Sinai	12	120	26	21	99
6th of October*	14	11	1	1	1
Suez	29	19	3	3	0
Aswan	34	99	12	12	265
Helwan*	43	9	1	1	0
Giza	74	19	5	5	0
Minia	129	28	3	3	0
Assiut	133	23	3	3	31
Beheira	468	17	3	3	0
Ismailia	654	29	7	6	1
Kafr el-Sheikh	762	10	4	3	0
Sharqia	1,278	17	4	4	0
Fayoum	1,375	39	4	3	0
Dakahlia	1,436	12	4	3	0
Alexandria	1,534	12	2	2	11
Qena	1,622	19	4	4	181
Bani Suef	1,733	46	2	1	0
Damietta	1,855	52	5	4	0
Gharbia	2,065	9	4	4	0
Menofia	2,135	25	3	3	0
Suhag	2,422	26	4	4	78
Qalubia	4,233	17	2	2	0
Port Said	7,927	56	4	3	0
Luxor	8,206	26	7	7	193
Cairo	36,386	17	1	1	0

* The population density figures for 6th of October and Helwan are estimates.
Source: Created by the authors from budgetary records of the Government of Egypt.

is a great degree of unaccounted-for variability in the allocation. Population density, in other words, is also not a meaningful implicit factor in these non-formula allocations.

Compensation for Internal Inequity?

It was hypothesized that some of the differences in funding could be related to one of three further factors: (1) poverty rates, (2) percentage of population that is rural, or (3) internal inequity. All of these, if they are in fact important implicit factors in the allocations, would survive being made explicit. Note that some of these could be proxies for each other, or correlated. The hypothesis guiding this principle is that perhaps a political-economic consideration (though most likely an implicit one) is that governorates need to be subsidized to control the levels of inequity *internal* to them. This would have a clear logic and appeal. Consider two governorates that are otherwise equal with regard to GDP per capita, say, but one of which is more unequal, internally, than the other. Since inequity and social frustration are more likely to operate at the local level, it seems reasonable to try to create social

stability by subsidizing subnational governments whose internal inequalities are high, so that they can take care of these issues.

However, no significant correlation was found between any of these factors and the spending per student, no matter how the spending was classified, except in the opposite of the direction one would hope, as shown in Table 6. The correlations that are statistically significant at the 5 percent level are highlighted with bold font. Naturally, the expenditure categories are correlated with each other; one would expect that. But as shown in the first column, the main expenditure category—*Total BAB2 allocation*—is not significantly correlated with any important variable, except that it is positively correlated with the Human Development Index (HDI): the better-off governorates get more funding. Reading across the HDI row, one can see that the better-off governorates get more funding in every category.

A couple correlations are interesting for their own sake: (1) the higher the HDI, the greater the internal inequity, which means the more developed governorates are also the more unequal; and

Table 6. Cross-governorate correlations, all factors

	Total BAB2 allocation	Allowances for remoteness	Nutrition	Transpor-tation	Population density	GDP per capita	Within-governorate inequity*	Poverty rate	Rurality	HDI
Total BAB2	1.00									
Allowances for remoteness	**0.98**	1.00								
Nutrition	**0.84**	**0.71**	1.00							
Transportation	**0.67**	**0.54**	**0.76**	1.00						
Population density	-0.14	-0.13	--0.18	-0.20						
GDP per capita	0.07	0.07	0.06	-0.13	-0.06	1.00				
Within-governorate inequity*	0.09	0.08	0.07	0.05	0.08	0.01	1.00			
Poverty rate	0.10	0.16	0.04	-0.11	-0.25	-0.17	-0.31	1.00		
Rurality	-0.20	-0.13	-0.29	-0.16	-0.37	0.18	**-0.54**	**0.52**	1.00	
HDI	**0.43**	**0.37**	**0.39**	**0.46**	0.13	0.25	**0.50**	**-0.67**	**-0.66**	1.00

* Measured as the standard deviation of GDP per capita across the various districts of each governorate.
HDI = Human Development Index.
Note: Expense items refer to per-student expense. Bold indicates correlations that are statistically significant at the 5 percent level.
Source: Analysis carried out by the authors.

(2) the more rural governorates have less internal inequity, also a logical result. In summary, there is no meaningful pattern to the data, except in undesirable directions. This continues the line of evidence: There is no apparent implicit conventional (publicly defensible) rationality in the non-formula funding. In fact the only rationality or pattern found is least likely to be publicly defensible since it is anti-poor.

Are Allocations Unstable Over Time?

We have seen that the allocations do not obey implicit factors that could be put publicly defensibly and explicitly in a formula. But if these allocations have been highly unstable over time, then introducing a formula in which there were winners and losers would not alarm anyone, largely because no one would have developed a sense of entitlement or expectation. Unfortunately, this has not been the case. In fact, since the allocations appear to be based on history (i.e., muderiyat receive more or less what they got the year before plus a percentage increase), they are quite stable, with the correlation between governorates' allocations (that is, the correlation of total BAB2 allocation between governorates) in the two most recent years being 0.99—*extremely* stable. Moreover, the within-governorate correlation between the allocations to individual items averaged 0.99. Thus, while these allocations are random with respect to need, they are highly stable over time, so one would expect that a sense of entitlement has developed—in fact, more than a sense: one would expect specific interest groups to be associated with these lines of expenditure within the governorates that have been, somewhat randomly (or based purely on negotiating power and political considerations), more favored in the past.

Local Awareness of Inequity

The analyses above reflect our attempts to use data and correlational analysis to discover whether there are any patterns in the allocations that, if uncovered, could become explicit and publicly defensible factors in a formula, and also, if there seem to be no such factors, to see whether the allocations are stable and are likely to have created expectations. We find

that there appear to be no clear patterns causing the differences in allocations, but that the differences in allocations are stable over time and are therefore likely to have created expectations.

However, it is possible to round out the statistical analysis with more direct questioning of key informants. We carried out an informal field investigation in order to get a sense of muderiyat officials' cognizance of many of the issues raised in this paper. Our approach was to ask a number of questions of muderiya officials in two governorates that had relatively high per-student allocations (South Sinai and Aswan). In general, muderiya staff persons were not aware of how their muderiya ranked in terms of per-student expenditure, as compared with other muderiyat. Even in cases where a muderiya was receiving multiple times more per student than another muderiya, staff were generally unaware of these inter-muderiya differences which, to an analyst looking at the data, are striking. When we told staff persons of the inequalities, they were typically unable to give reasons as to why the disparities existed, other than some rather circular reasoning such as nutrition expenses being higher because more food is supplied. In some simple instances, however, staff persons were able to offer an explanation, such as high transport costs in South Sinai. Thus, in general, staff seemed to be unable to explain differences—which somewhat (though only somewhat; maybe staff simply are not aware of the reasons, and the fact that they were not aware of the differences in per capita allocations between muderiyat suggests that they would also not be aware of why those differences exist) confirms the statistical analysis that finds no conventionally rational explanation for the differences.

Staff persons who were involved in the general budgeting process negotiated with the MOF in isolation from their peers and colleagues in the other governorates and the MOE. This is one factor that could explain the lack of comparative unit cost awareness. It also means that budgeting tends to be unguided by national priorities. In fact, the only people who possessed ready access to comparative

data were those in the national MOF, but these data do not seem to have had much currency, even there.

However, though unaware of how their own muderiya stood in relation to others in terms of per-student allocations, staff persons were quite aware of their yearly total budgeting and the budget for various line items. Their records were meticulous. Accordingly, introducing an equity-based funding formula that produces losers could be quite problematic, unless done in a no-harm manner. It is interesting to note that, as we discovered, in some cases line items were higher than what the muderiyat negotiated for, and in other cases lower, and in neither case could the staff adequately explain why this occurred. It suggests a very ad hoc budgetary process and suggests that current allocations are a stable and long-term accretion of ad hoc decisions, which the statistical analysis already suggested (with the exception of the allocation to "remote" muderiyat, though, again, the disaggregation of these allocations could not typically show why those muderiyat had higher allocations).

Winners and Losers

Given the apparent randomness shown in the analyses above (that is, given that the allocations do not respond to implicit factors that could be made explicit and publicly defensible), a logical policy recommendation is to suggest a formula that can make the funding more transparent and publicly defensible and that can base the funding on some measurable sense of equity and/or need, and then see what happens to the current allocations.

Table 7 shows the results of doing this. The column labeled *EGP per student with funding formula* shows what each muderiya would receive per student using such a formula. The last column shows the percentage difference between what each muderiya would get via this funding formula relative to what they actually received per student. Aswan, Mattrouh, New Valley, North Sinai, Red Sea, and South Sinai stand to be very big losers, losing up to 93 percent of what they were getting per student if a funding formula were to be introduced, illustrating the serious practical and political nature of the problem.

Table 7. Simulation of the impact of introducing a funding formula

Governorate	Enrollment	Total BAB2 (EGP)	EGP per student	EGP per student with funding formula	% difference
6th October	523,188	12,984,000	25	77	2.06
Alexandria	720,456	38,145,000	53	68	0.28
Assiut	782,210	55,282,000	71	83	0.17
Aswan	**247,635**	**100,478,000**	**406**	**70**	**-0.83**
Bani Suef	566,962	38,622,000	68	79	0.16
Beheira	1,006,660	38,276,000	38	74	0.96
Cairo	980,896	52,010,000	53	68	0.29
Dakahlia	1,011,325	37,975,000	38	72	0.89
Damietta	247,477	20,578,000	83	68	-0.18
Fayoum	559,451	32,050,000	57	86	0.51
Gharbia	758,869	22,981,000	30	70	1.33
Giza	485,647	23,323,000	48	77	0.59
Helwan	350,576	10,416,000	30	68	1.27
Ismailia	206,759	13,339,000	65	69	0.07
Kafr el-Sheikh	527,748	17,419,000	33	78	1.37
Luxor	96,208	23,958,000	249	75	-0.70
Mattrouh	**78,867**	**24,095,000**	**306**	**76**	**-0.75**
Menofia	693,825	34,347,000	50	73	0.46
Minia	973,518	44,754,000	46	82	0.79
New Valley	**45,289**	**43,745,000**	**966**	**65**	**-0.93**
North Sinai	**81,011**	**23,423,000**	**289**	**72**	**-0.75**
Port Said	104,927	10,078,000	96	64	-0.33
Qalubia	880,748	31,700,0009	36	72	1.00
Qena	683,370	150,380,000	220	78	-0.65
Red Sea	**50,579**	**30,162,000**	**596**	**60**	**-0.90**
Sharqia	1,117,204	59,837,000	54	74	0.37
South Sinai	**16,152**	**6,922,000**	**429**	**61**	**-0.86**
Suez	118,438	6,524,000	55	65	0.17
Suhag	824,249	98,660,000	120	82	-0.32

Note: The funding formula is enrollment- and Human Development Index–based, with weights of 0.50 being given to both enrollment and poverty shares, as was done in the pilot in Fayoum, Ismailia, and Luxor. See Healey and Crouch (2009) for a description. Bold indicates governorates that lose the greatest percentage of funds.

Source: Analysis carried out by the authors using data from budgetary records of the Government of Egypt.

Moreover, the situation does not really improve when the remoteness allowances and nutrition resources are taken out of the funding formula, as shown in

Table 8. While the absence of these line items softens the extent to which the big losers lose, they still lose quite a bit—upwards of 80 percent.

Table 8. Impact of applying a funding formula to the BAB2 allocations minus the remoteness allowances and nutrition funding

Governorate	EGP per student without allowances	EGP per student with funding formula	Percent change	EGP per student without remote allowances and without nutrition	EGP per student with funding formula	Percent change
6th of October	24	50	1.08	**13**	22	0.69
Alexandria	42	45	0.07	30	19	-0.37
Assiut	40	54	0.35	17	25	0.47
Aswan	140	46	-0.67	42	22	-0.48
Bani Suef	68	52	-0.24	23	26	0.13
Beheira	38	49	0.29	21	24	0.14
Cairo	53	45	-0.15	36	17	-0.53
Dakahlia	38	47	0.24	26	24	-0.08
Damietta	83	44	-0.47	31	23	-0.26
Fayoum	57	56	-0.02	19	26	0.37
Gharbia	30	46	0.53	21	23	0.10
Giza	48	50	0.04	29	18	-0.38
Helwan	30	45	0.50	21	20	-0.05
Ismailia	63	45	-0.29	34	23	-0.32
Kafr el-Sheikh	33	51	0.55	23	25	0.09
Luxor	56	49	-0.13	30	24	-0.20
Mattrouh	202	50	-0.75	42	25	-0.40
Menofia	49	48	-0.02	25	24	-0.04
Minia	46	54	0.17	18	25	0.39
New Valley	226	42	-0.81	70	23	-0.67
North Sinai	190	47	-0.75	71	24	-0.66
Port Said	96	42	-0.56	40	21	-0.48
Qalubia	36	47	0.31	19	23	0.21
Qena	39	51	0.31	20	25	0.25
Red Sea	187	40	-0.79	53	21	-0.60
Sharqia	54	49	-0.09	36	24	-0.33
South Sinai	243	40	-0.84	**111**	22	-0.80
Suez	55	42	-0.24	36	21	-0.42
Suhag	42	54	0.29	16	25	0.56

Note: In column 4, bold indicates the lower and upper ends of the range of EGP per student without allowances and without nutrition funding.

Source: Created by the authors from budgetary records of the Government of Egypt.

There seems to be a serious dilemma, then: traditional allocations are ad hoc and are not based on clear criteria that could be made explicit and be publicly defensible. But (not coincidentally) introducing a formula that is based on clear and transparent criteria that are likely to withstand public discourse would create big losers, who are likely to be opposed to the changes even if they can be shown to be in the national interest or can be shown to improve equity and efficiency.

Potential Solution

We have argued that the inequity problem highlighted in Table 3 is fairly serious and have just argued that, furthermore, allocating funds according to a more rational, population- and poverty-driven basis would create losers and might thus generate opposition.

However, we can argue, from a slightly different perspective, that the problem is not really that serious after all. Why? First, the majority of governorates with very high per-student funding are relatively small in absolute terms. Even if one counts all the governorates that would lose, it amounts to only 35 percent of total national student enrollment. If one counts only those governorates that would lose more than 25 percent of their funding, it is only 11 percent of enrollment. This means that even if their funding were admitted to be somewhat ad hoc, and they were held harmless (i.e., they would be guaranteed to receive allocations on a per-student basis that were not less than the per-student allocation they had received the year before), holding them harmless would not affect the implementation of the proposed solution much. Furthermore, not all of the losers would lose by a lot. In this sense, crafting a solution may not be as difficult as it seemed at first.

A "Hold Harmless" Approach

Table 9 shows the results of using an enrollment- and poverty-based funding formula to distribute BAB2 resources while holding harmless those governorates that would lose on a total-allocation basis. The data in Table 9 (following page) reflect a 1 percent annual increase in enrollment and a 15 percent increase in the budget (due to both GDP growth and inflation).[9] The amount of BAB2 that has been distributed by this funding formula excludes the remote allowances but includes the nutrition line item and the additional EGP 210M that has been allocated to the muderiyat for maintenance referenced in Table 1.

The table shows only the amount of money that we refer to as *misallocated*: those excess resources needed to hold harmless the governorates that would lose money if they were to receive what the funding formula would allocate to them. If these governorates were held harmless, they would receive in absolute terms what they received in 2010 until such time that the amount of money that they received from the funding formula was greater (in nominal terms) than what they received in 2010. At that point, they would factor into the funding formula distribution scheme along with all the rest of the non-loser governorates.

In Table 9, the total amount of misallocated money amounts to 11.67 percent in 2010. Within two years this number drops to 5 percent of the total money being allocated, and in another four years it drops to a mere 1 percent. So, while the inequity problem that needs to be solved is indeed egregious, it appears that it can be fairly easily solved if one takes time into account and uses both growth and inflation to soften the impact on the erstwhile-privileged muderiyat.

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9   The paper was written at a time when both growth and inflation were fairly high. After the current political turmoil, growth has slowed down, but inflation appears to have risen. It may still be possible to carry out the nominal hold-harmless approach suggested here, due to the higher inflation. A low-inflation, low-growth scenario, though, should it materialize, would make the approach difficult to implement as quickly as suggested here, and may take twice as long.

Table 9. Misallocated BAB2 funding (in EGP) when all funding losers are held harmless with the introduction of an enrollment- and poverty-based funding formula

Governorate	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
6th of October	0	0	0	0	0	0	0	0	0	0	0	0
Alexandria	0	0	0	0	0	0	0	0	0	0	0	0
Assiut	0	0	0	0	0	0	0	0	0	0	0	0
Aswan	22,979,687	20,701,081	18,080,683	15,067,226	11,601,751	7,616,454	3,033,363	0	0	0	0	0
Bani Suef	10,069,118	4,543,933	0	0	0	0	0	0	0	0	0	0
Beheira	0	0	0	0	0	0	0	0	0	0	0	0
Cairo	5,952,028	0	0	0	0	0	0	0	0	0	0	0
Dakahlia	0	0	0	0	0	0	0	0	0	0	0	0
Damietta	8,999,865	6,759,414	4,182,895	1,219,898	0	0	0	0	0	0	0	0
Fayoum	2,541,463	0	0	0	0	0	0	0	0	0	0	0
Gharbia	0	0	0	0	0	0	0	0	0	0	0	0
Giza	0	0	0	0	0	0	0	0	0	0	0	0
Helwan	0	0	0	0	0	0	0	0	0	0	0	0
Ismailia	3,335,205	1,442,939	0	0	0	0	0	0	0	0	0	0
Kafr el-Sheikh	0	0	0	0	0	0	0	0	0	0	0	0
Luxor	661,739	0	0	0	0	0	0	0	0	0	0	0
Mattrouh	11,983,607	11,226,725	10,356,310	9,355,333	8,204,210	6,880,418	5,358,058	3,607,343	1,594,021	0	0	0
Menofia	699,961	0	0	0	0	0	0	0	0	0	0	0
Minia	0	0	0	0	0	0	0	0	0	0	0	0
New Valley	8,172,447	7,771,393	7,310,182	6,779,788	6,169,836	5,468,390	4,661,728	3,734,066	2,667,256	1,440,423	29,566	0
North Sinai	11,522,550	10,767,785	9,899,806	8,901,629	7,753,726	6,433,638	4,915,537	3,169,720	1,162,031	0	0	0
Port Said	5,294,113	4,368,397	3,303,824	2,079,564	671,666	0	0	0	0	0	0	0
Qalubia	0	0	0	0	0	0	0	0	0	0	0	0
Qena	0	0	0	0	0	0	0	0	0	0	0	0
Red Sea	7,216,274	6,781,710	6,281,962	5,707,251	5,046,334	4,286,279	3,412,216	2,407,044	1,251,095	0	0	0
Sharqia	5,285,710	0	0	0	0	0	0	0	0	0	0	0
South Sinai	3,203,470	3,064,429	2,904,533	2,720,651	2,509,188	2,266,005	1,986,345	1,664,735	1,294,884	869,556	380,428	0
Suez	1,103,941	55,122	0	0	0	0	0	0	0	0	0	0
Suhag	0	0	0	0	0	0	0	0	0	0	0	0
Total	109,021,179	77,482,929	62,320,194	51,831,343	41,956,711	32,951,185	23,367,246	14,582,908	7,969,287	2,309,979	409,994	0
% Budget	11.67%	7.21%	5.05%	3.65%	2.57%	1.75%	1.08%	0.59%	0.28%	0.07%	0.01%	0.00%

Source: Simulation carried out by the authors.

Conclusions and Policy Implications

In the period leading up to the Arab Spring, Egypt had already embarked on decentralization of certain expenditures using an equity-based, pro-poor, highly transparent funding formula. This experiment showed that it is indeed possible (technically and politically) to allocate funds in this manner, and stakeholder reaction to the new way of transferring funds was overwhelmingly positive. Other important education expenditures (such as personnel costs and a large portion of non-personnel recurrent costs) had already for many years been transferred to the muderiyat, but using no clear formula or allocation criteria. This paper shows that non-personnel recurrent allocations were extremely unequal, with per-student allocations in some muderiyat being hundreds of times greater than per-student allocations in other muderiyat. When such funds are allocated in such an inequitable manner, and there is no clear reason for doing so, those jurisdictions that receive more money per student are greatly advantaged over those that receive less money per student.

This inequitable distribution of funds is the product of a constellation of factors. The formal government budgeting process is driven largely by a bottom-up accumulation of wish lists. Lower-level jurisdictions are asked by their higher-level counterparts for an estimate of the resources they need in the upcoming year. Since need always outstrips available resources, these wish lists result in exaggerated and incoherent budgets. With these figures in hand, muderiya authorities negotiate with the MOF for the resources they allegedly need. Those who can negotiate better have an obvious advantage over those who cannot. Once the budget is passed by parliament, some approximation of what was requested and negotiated finds its way down to lower-level jurisdictions. Clearly, equity-based formula funding does not factor into the budget-finance cycle at all.

Per-student funding need not be *equal*. Vertical equity arguments maintain that on a per-student basis, poor jurisdictions should get more than less poor jurisdictions. And if in rural jurisdictions it costs more to do and/or buy certain things, then that would lead to a higher per-student allocation than in

jurisdictions where these things are not so expensive. The analyses performed in this paper show that while some of the inequitable allocation can be explained (e.g., allowances for personnel working in remote regions of the country), much cannot. As a result, the children in those jurisdictions where the per-student allocations are low simply aren't as educationally well-served as those students in jurisdictions where the per-student allocations are inexplicably high. In a modernizing Egypt (the hopeful outcome of the Arab Spring) these per-student allocations would need to become a lot more equitable and to the extent they are not the same, viable reasons must account for it.

Short of overhauling the entire budgeting and financing process in Egypt, a topic for another paper, a logical solution to this problem would be to allocate funds according to the successful experimental equity-based formula described in the paper. However, a simulated allocation of these traditional allocations according to the new, experimental formula, showed that many muderiyat would be losers (by logic, about half would get less money than they had been getting per student) in the reallocation, which could lead to a negative political reaction against the use of transparent equity-based formulas for allocating funds. Further simulations show that if one assumes a reasonable amount of economic growth and some inflation, these losing muderiyat would receive allocations per student that were at least the same as the per-student allocation they had received the year before (i.e., be held harmless), thus making it politically palpable and thus possible to introduce equity-based formula funding over several years.

Given the profoundly political-economic nature of such changes, however, even when the losses are "nominal" and could be absorbed over a few years, a very deliberative approach will be required. A considerable amount of policy dialogue, experimentation, mobilization of the opinion of those with a favorable impression from the formula-based experiment, would all be required. Once the current tensions are hopefully over, Egypt has options in moving towards a fairer and more efficient way to allocate its education funds.

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