Government Spending and Regional Poverty Alleviation: Evidence from Egypt

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Abstract: Poverty is one of the major socio-economic problems facing most developing countries. In Egypt, 29.7 percent of citizens live below the poverty line. The problem is more evident at the regional level, especially in Upper Egypt. Reducing poverty could be achieved through better allocation of government spending as it is considered an essential factor to promote economic growth, improve income distribution, and reduce poverty. Understanding the relationship between government spending and regional poverty reduction will help policymakers to design and implement programs that have the ability to design and implement programs that can reduce regional poverty and lessen income inequality effectively. This study aims to analyze the impact of government spending in alleviating regional poverty in Egypt. A panel data set for Egypt's 27 governorates through (2010-2018) has been employed. Using the two-way fixed effect regression model, the study finds that social government spending significantly affects poverty reduction across regions. At the regions level, health, education and social government expenditures have a significant negative impact on poverty health, education, and social government expenditures have a significant negative impact on poverty at the regions' level, especially in Upper Egypt and Cairo regions.

***JEL classification*:** H5, I32, R58

Keywords: government spending, regional poverty, Egypt.

1. Introduction:

Poverty entails both monetary and non-monetary aspects. The level of income poverty is determined by measuring the income necessary to meet basic needs. In contrast, non-income poverty is based on aggregating data on the prevalence of deprivations in basic human capabilities, such as education, health insurance, electricity, water, and energy (Wang et al., 2016). A common feature of poor people is that they suffer from inadequate access to some human capital facilities essential to escape from poverty (Gachassin et al., 2010). Increasing income and reliable access to schools and health services for the poor contribute directly to the reduction in all poverty forms.

According to Household Income, Expenditure and Consumption Survey HIECS 2017/2018, the percentage of Egyptians living below the poverty line (Poverty rate) increased during 2017/2018 to 32.5%, compared to 27.8% in 2015. The national poverty estimates, calculated using a new poverty line, set each survey year as the poverty line is defined as the

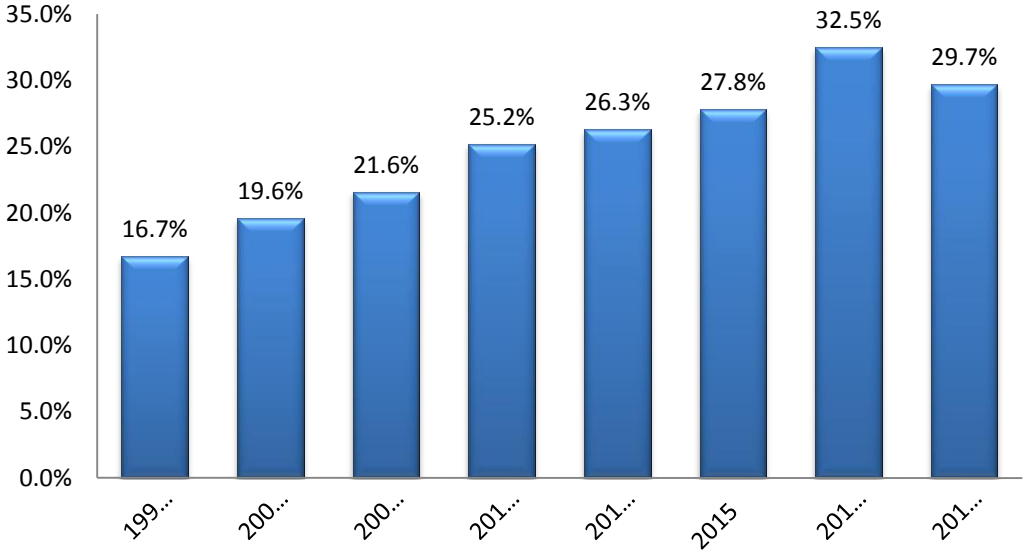
minimum income deemed adequate for an individual to meet their basic needs. These poverty lines are changing over time to reflect the most recent consumption patterns of the population (World Bank, 2020). The poverty line in Egypt increased from L.E. 482 pounds in 2015 to L.E. 735.5 monthly in 2017, which was , given the high inflation that increased from 10.9% in 2015 to 23.5% in 2017. The problem is more evident at the regional level as the poverty rate exceeds 50% in some governorates, especially in Upper Egypt.

As part of the country's economic reform program supported by a $12 billion bailout package from the International Monetary Fund in 2016, the government floated the currency, slashed subsidies on fuel, services, and utilities, and imposed a value-added tax which affected people purchasing power. Phasing out fuel subsidies would create more room in the budget for better-targeted social spending and more investment in health, education, and public infrastructure, which could alleviate the burden on people. Furthermore, the expansion of targeted cash transfer programs, such as *Takaful* and *Karama* that has designed to protect the poor through income support and covered 9.4 million individuals by 2018 would help in support people's income directly. To investigate the impact of country fiscal policy, especially the expenditure side, on poverty, the study focuses on analyzes the effects of public spending in various sectors, including health, education, and social services, on alleviating regional poverty in Egypt using panel data set of Egypt's 27 governorates during 2010-2018. Section 2 presents the regional poverty profile in Egypt, considering the differences between the regions. Section 3 gives an overview of government spending in Egypt and the pattern by which it is distributed. Section 4 illustrates some literature reviews regarding the relationship between government spending and income poverty. Section 5 discusses the methodology and the estimation results focusing on national and regional impacts. Finally, policy recommendations follow.

2. Regional Poverty Profile in Egypt:

About a third of Egypt's population was considered poor in 2020. The poverty rate has increased from 16.7% in 1999/2000 to 21.6% in 2008/2009 and 27.8% in 2015, reached its highest rate in 2017/2018 (32.5%), then fell by 2.8% during the fiscal year of 2019/2020, recording 29.7 percent (figure. 1).

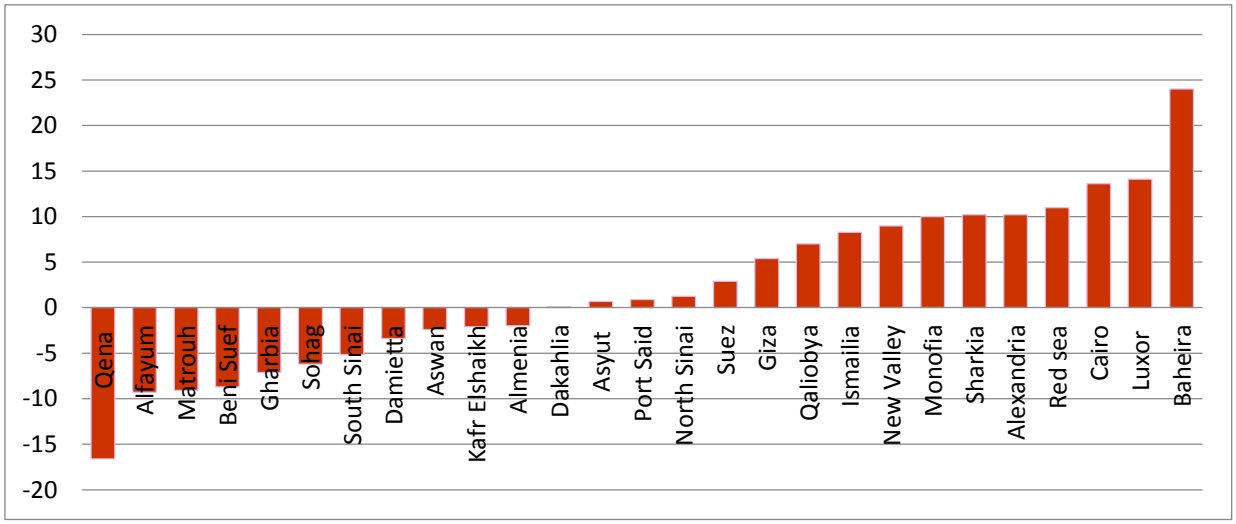
Figure.1 Poverty Rates in Egypt (1999-2020)



Source: CAPMAS, 2020.

Despite the increasing poverty rate at the national level, the situation is obviously different for governorates. To overview the unified poverty rates and changes across regions, we compare their poverty incidence across governorates depending on the 2015 and 2017/2018 HIECS estimations. Figure 2 shows that about 15 out of 27 governorates have experienced an increase in poverty rates while poverty rates have decreased in the rest. Where some governorates experienced a high rise in poverty rates between 2015 and 2018; for example, Baheira, Luxor, and Cairo, other governorates experienced a sharp decrease in poverty rates like Qena, which decreased from 57.8 in 2015 to 41.2% in 2017/2018. This could prove that the poverty reduction policies did not fail in all governorates and that goals were accomplished in some regions.

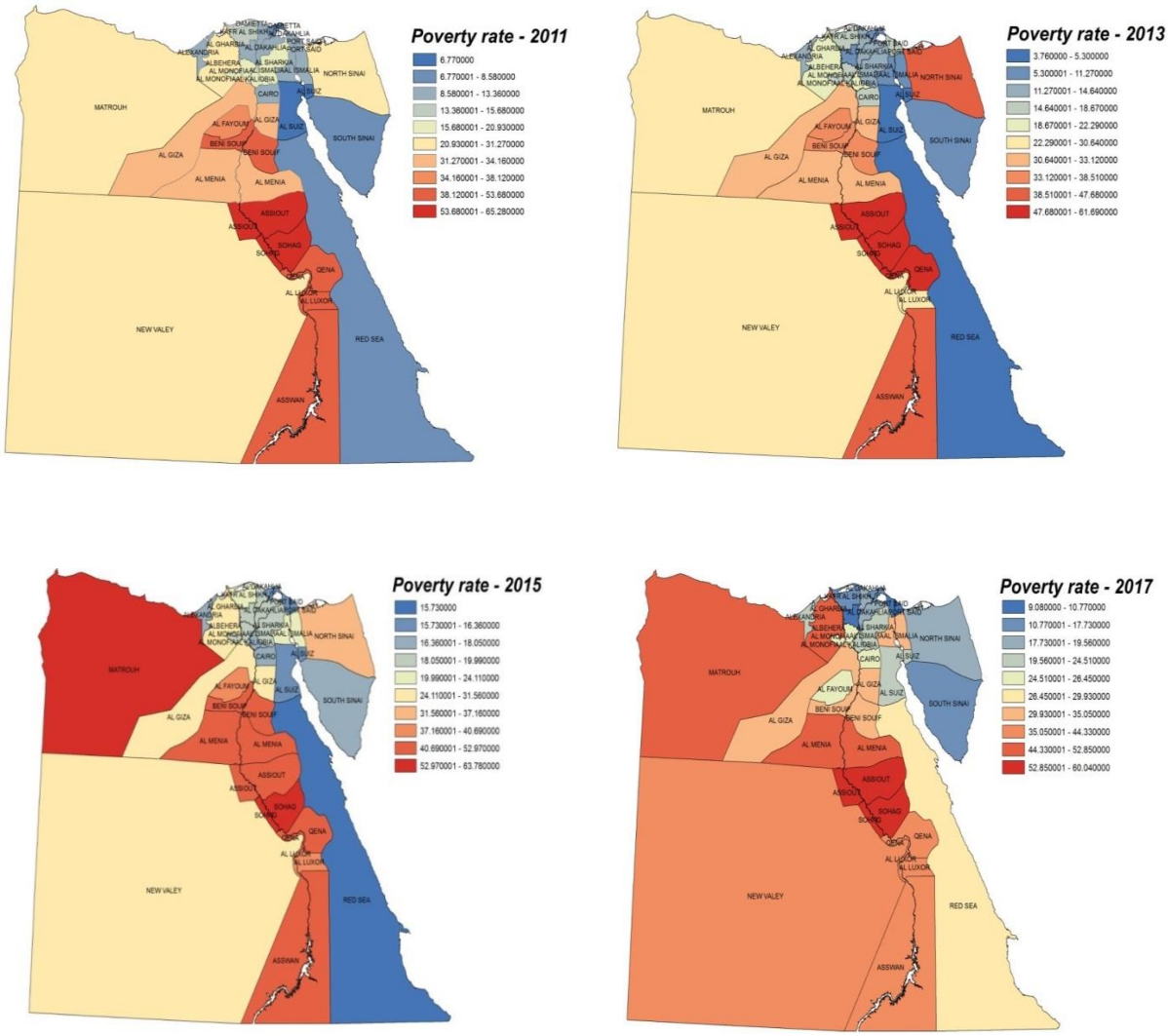
Figure.2 Changes in Poverty rates in Egypt's governorates (2015-2017/2018)



Source: Based on 2015 and 2017/2018 HIECS surveys.

Analyzing the poverty rates in the 27 governorates from 2010 to 2018 showed that the incidence and severity of poverty varied considerably across regions. Poverty rates are different across regions; its trend is also different. Poverty maps of Egypt's governorates could clarify the issue more clearly (figure.3). Where poverty rate in some governorates does not exceed 5%, more than 50% of the population in some governorates suffers from poverty. In some governorates, the poverty ratehas increased over time (Dakahlia and Ismailia), while, in most regions, the poverty rate fluctuated over the research period, making it challenging to identify a poverty trend for them.The maps show that the governorates' poverty rate changed from one period to another reflecting minor and sharp changes in poverty rates. In Red Sea for example, has experienced a sharp rise in the poverty rate from 3.76 in 2012/2013 to 27.6% in 2017. In Other governorates like Qena, and Beni Suef, the poverty rate has decreased over the period.

Figure 3. Poverty maps across of Egypt's governorates (2010-2018)



Source: Maps created using ArcMap based on Poverty Map data, CAPMAS (2018).

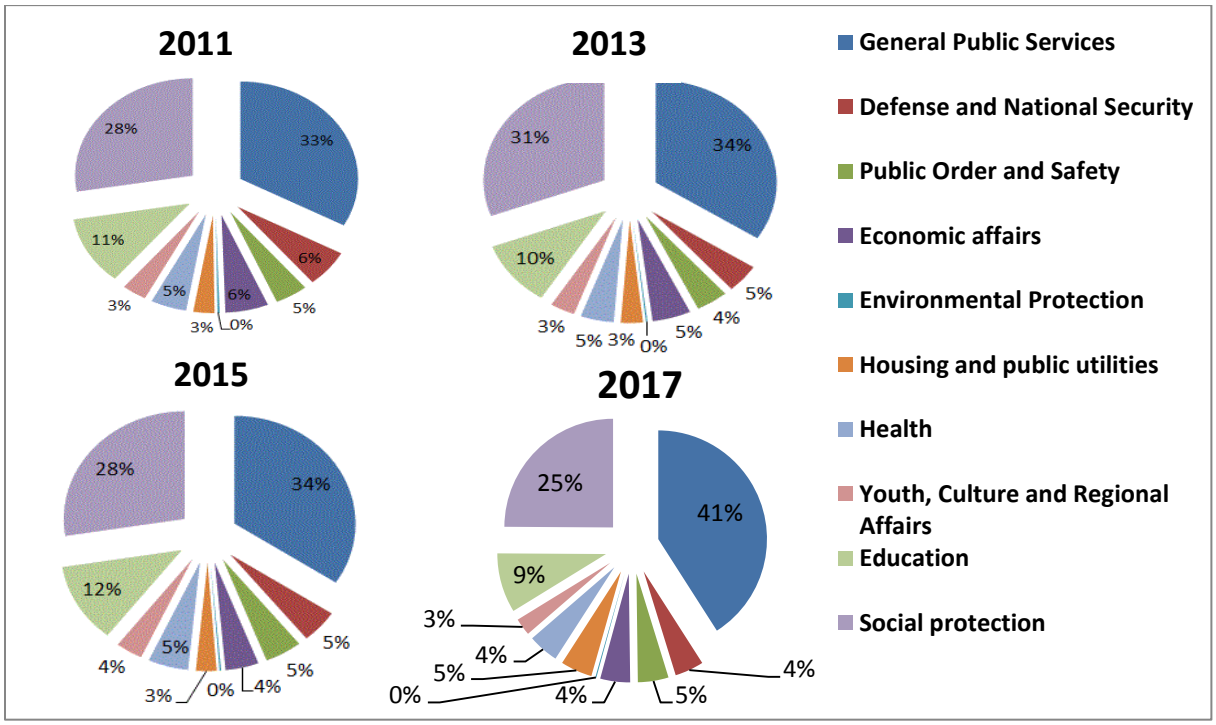
3. Government Expenditures Allocation System:

According to the(World Bank, 2001), strategies to reduce poverty should target three main dimensions: opportunity, security, and empowerment. Opportunities people require include jobs, credit, roads, markets, and electricity, water, sanitation, schools, and health services that underpin the health and skills essential for work. On the other hand, security can be achieved by reducing vulnerabilities to economic shocks, natural disasters, ill health, disability, and personal violence. Their participation in the policy process can enhance the empowerment of the poor.

Regarding the opportunity dimension, creating human capital, physical, natural, and financial assets that poor people own or can use could be enhanced through public spending on poor people and expanding the supply of essential social and economic services. Spending on health, education, and social services can support the human capital, affecting the poor's income and hence contributing to poverty reduction

Government-provided benefits include spending on health, education, social sectors, and other sectors. The function distribution of the budget shows despite its decreasing trend over the period; the social services sector is considered the second largest sector after the public services sector. Its share of total expenditures was about 25% in 2017/2018. Education spending share is about 9% of the total budget, making it the third-largest sector, while health expenditures do not exceed 4% of the total expenditures.

Figure.4 Shares of Functions in the Total Budget 2011/2012-2017/2018

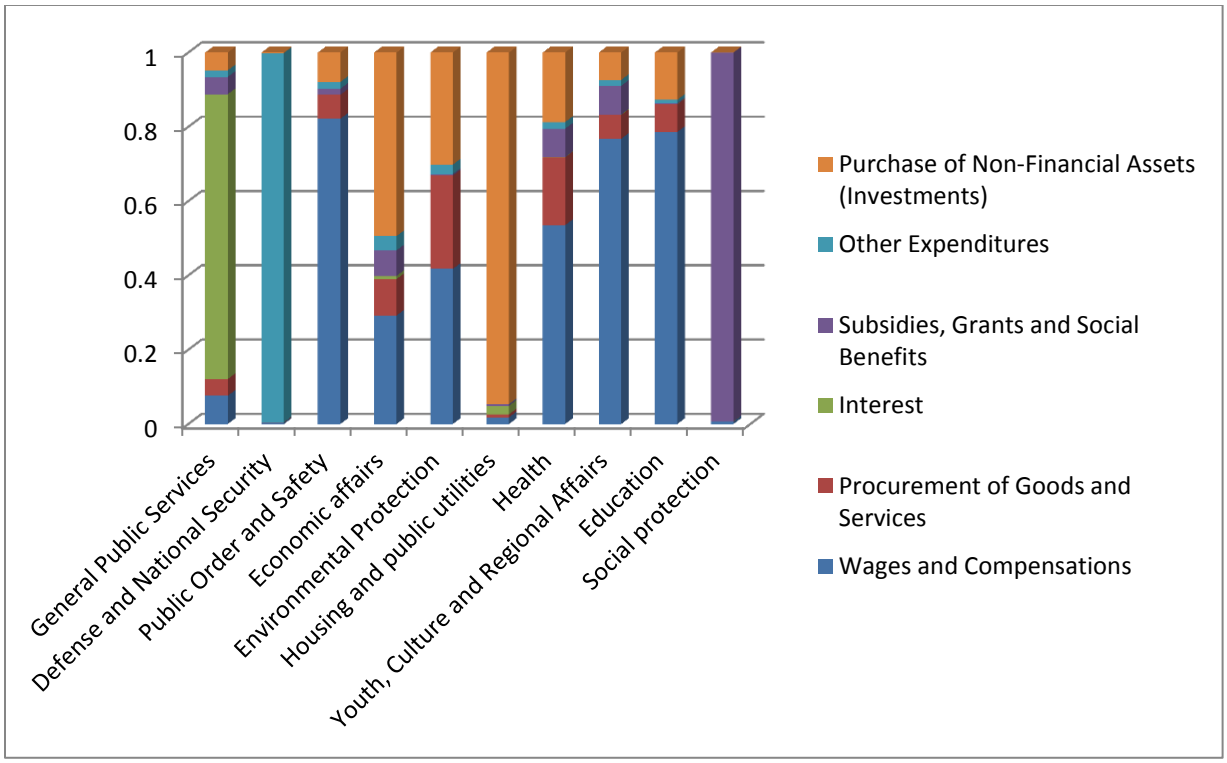


Source: based on budget documents, The Ministry of Finance.

The economic classification of government expenditure would better specify their sectorial role to serve society. The largest share of public spending in both health and education sectors goes to the compensation of employees the largest share of social services sector is allocated to subsidies, grants, and social benefits. This share is accounted for 90% of the total

government spending on subsidies and social benefits. Social spending includes conditional cash transfers, transfers to vulnerable groups (such as widows, children, and the elderly), pension payments, and food smartcard program that transfer to the beneficiary families. Energy subsidies in electricity, liquefied petroleum gas (LPG), gasoline, and other fuel products are also a large part of the social protection program the government relies on to support the low-income segment of society (Ibarra et al., 2019).

Figure.5 Shares of economic classification of Expenditures functions 2017/2018



Source: based on budget documents, The Ministry of Finance.

4. Literature Review:

The relationship between government spending and income poverty is complex and may vary depending on the type of spending being considered. While government spending on transfers and subsidies can reduce poverty directly by raising the real disposable income of poor households, government spending on basic health and education services and certain types of infrastructure are also widely considered to reduce poverty indirectly by increasing the productivity and earnings potential of poor households (Anderson et al., 2018; Liu et al., 2020).

Moreover, the component of public spending sectors affects their contribution to poverty reduction.

Several studies have investigated the relationship between government spending and poverty, demonstrating mixed results. For the total government expenditures, (Miar & Yunani, 2020) and (Sasana & Kusuma, 2018) have reported a negative relationship between government expenditure and poverty in Indonesia using panel data techniques at the sub-national level. (Chude et al., 2019; Yaekob, 2016) have found that government expenditure has a significant short-run impact on poverty reductions in Ethiopia and Nigeria. On the other hand, (Anderson et al., 2018) found no clear evidence that higher government spending has played a significant role in reducing income poverty in low-and middle-income countries which was consistent with the view that fiscal policy plays a much more limited redistributive role in developing countries, in comparison with OECD countries. Consistent with this result, using county data for the Southern United States, (Jung et al., 2009) concluded that the marginal effects of government expenditures on poverty alleviation have decreased over time.

Studies on different government spending results have investigated further contributions as well. According to (Fan, 2007; Fan et al., 1998) government spending on education significantly impacts poverty reduction after the expenditure on roads and agriculture. (Fan & Zhang, 2008) has reported that education and health expenditures have a negative effect on poverty, but the impact of education was more significant than the effect of health expenditures. Increasing public investment in education, health, and infrastructure has a positive impact on reducing poor people as a percentage of the total population (Campodónico et al., 2014). (Hidalgo-Hidalgo & Iturbe-Ormaetxe, 2017) also found that public expenditure on education has a strong long-run effect on reducing the incidence of poverty. This effect is concentrated mainly among individuals who have parents with a low level of education. Policies to promote economic growth, education, health, and government spending on infrastructure have positively affected the declining number of poor people (Asrol & Ahmad, 2018). (Liu et al., 2020) reported that expenditures on education, healthcare, social security, and infrastructure have shown sound poverty alleviation effects. Government expenditures on both health and education have a significant positive result on per capita income which contributes directly to poverty reduction (Oriavwote & Ukawe, 2018). Using panel data of regencies in Gorontalo, a study demonstrated

that public expenditures on education and health had adverse and significant effects on the poverty level in all regencies/cities (Arham & Naue, 2015).

(Omari & Muturi, 2016) showed that health sector expenditures have a positive and significant effect on poverty reduction while the impact of education sector expenditure on poverty level was insignificant. On the contrary, another study's results show that government spending on education significantly contributes to poverty reduction. At the same time, the health sector does not significantly impact poverty reduction in Pakistan (Asghar, 2012). (Omodero, 2019) argued that government expenditure on education and health does not significantly impact poverty alleviation in Nigeria. Also, (Alamanda, 2020) finds that social aid, subsidy, and grant expenditure have an insignificant effect on reducing income inequality and poverty in Indonesia

Focusing on the difference between rural and urban poverty alleviation impacts, a study on the impact of public spending on health and education sectors shows a different effect on poverty reduction between urban and rural areas. Convincingly, spending allocation on health and education has significantly reduced poverty rate in rural areas, while the decline of poverty rates in urban is likely more influenced by spending on health. The study also shows that social protection spending did not have a significant effect on reducing poverty rates in both urban and rural areas (Taruno, 2019). Also, (Rachma et al., 2019) found that increasing village funds impacts poverty and village income inequality in the long run.

For Egypt's economy**,** (Fan et al., 2006) concluded that universal subsidy is inefficient to alleviate poverty and that a targeted approach is much preferred to achieve higher economic growth rates and higher poverty reduction. The study also concluded that public investment needs to be prioritized in human capital (education and health) and infrastructure, particularly in rural Egypt, given that the majority of the poor are living there. At the regional level, the study recommended more investments in Upper Egypt which would lead to poverty reductions as poor people are increasingly concentrated in the region. Another study by the World Bank on the impact of fiscal policy on inequality and poverty in Egypt shows that Egypt's fiscal policies led to a decrease in poverty and has demonstrated that poverty and inequality could be reduced more effectively if the country would shift away from spending on untargeted energy subsidies to more targeted transfers (Ibarra et al., 2019). Analyzing the impact of government spending on

poverty in Egypt is still a pressing need, especially at the regional level, given the increasing rates in most regions. Alleviating poverty across the country, particularly in the most lagging governorates, needs more specific policies to improve the poor's human capital and physical assets, which would support a sustainable poverty reduction in Egypt.

5. Methodology and Results:

This section investigates the impact of government spending in various sectors (health, education, social services) on poverty reduction. Understanding the relationship between government spending and poverty, especially on the regional level, would help policymakers to design and implement programs that could effectively reduce regional poverty incidence and income inequality.

In order to examine the impact of government spending on poverty in Egypt, a set of equations using a panel data approach will be estimated. A panel data set of the 27 governorates for 2011, 2013, 2015, and 2017 has been employed. The poverty and employment data were sourced from the Central Agency of Mobilization and Statistics (CAPMAS), while the government spending data was obtained from the Ministry of Finance. The regression models in this study are divided into five groups based on the type of government spending as the main independent variable. To apply the differences between regions and over time, a Two-way Fixed Effects model has been used. The model includes a set of dummy variables to allow for capturing the differences between Egypt's seven regions which are Greater Cairo Region; Alexandria Region; Canal Region; Delta Region; North Upper Egypt Region; Central Upper Egypt Region, and Southern Upper Egypt.

The fixed-effect model was used instead of the random-effect method based on the Hausman test. Fixed-effects assume that differences between individuals (cross-sections) can be accommodated from different intercepts using the dummy variable technique. Such estimation models are often referred to as the Least Squares Dummy Variable technique or abbreviated LSDV (Zulfikar, 2018). The study estimates the impact of total government spending, health spending, education spending, social services spending, and the impact of health, education, and social services spending together using the following regression models.

- **The impact of Health, Education, Social Spending on Poverty.**

$$Pov_{it} = \alpha_0 + \alpha_1 Health._{it} + \alpha_2 Edu._{it} + \alpha_3 Social._{it} + \alpha_4 GRP_{C_{it}} + \alpha_5 Unemp._{it} + \gamma_i + \theta_t + \varepsilon_t$$

- **The impact of Total Government Spending on Poverty**.

$$Pov_{it} = \alpha_0 + \alpha_1 Gov._{it} + \alpha_2 GRP_{C_{it}} + \alpha_3 Unemp._{it} + \gamma_i + \theta_t + \varepsilon_t$$

$$Pov_{it} = \beta_0 + \beta_1 Gov._{it} + \beta_2 Gov.* region_{it} + \beta_3 GRD_{C_{it}} + \beta_4 Unemp._{it} + \gamma_i + \theta_t + \varepsilon_t$$

- **The Impact of Health Spending on Poverty**.

$$Pov_{it} = \alpha_0 + \alpha_1 Health._{it} + \alpha_2 GRP_{C_{it}} + \alpha_3 Unemp._{it} + \gamma_i + \theta_t + \varepsilon_t$$

$$Pov_{it} = \beta_0 + \beta_1 Health._{it\ .it} + \beta_2 Health.* region_{it} + \beta_3 GRP_{C_{it}} + \beta_4 Unemp._{it} + \gamma_i + \theta_t + \varepsilon_t$$

- **The Impact of Education Spending on Poverty.**

$$Pov_{it} = \alpha_0 + \alpha_1 Edu._{it} + \alpha_2 GRP_{C_{it}} + \alpha_3 Unemp._{it} + \gamma_i + \theta_t + \varepsilon_t$$

$$Pov_{it} = \beta_0 + \beta_1 Edu._{it\ .it} + \beta_2 Edu.* region_{it} + \beta_3 GRP_{C_{it}} + \beta_4 Unemp._{it} + \gamma_i + \theta_t + \varepsilon_t$$

- **The Impact of Social Spending on Poverty.**

$$Pov_{it} = \alpha_0 + \alpha_1 Social._{it} + \alpha_2 GRP_{C_{it}} + \alpha_3 Unemp._{it} + \gamma_i + \theta_t + \varepsilon_t$$

$$Pov_{it} = \beta_0 + \beta_1 Social._{it\ .it} + \beta_2 Social.* region_{it} + \beta_{3G} GRP_{it} + \beta_4 Unemp._{it} + \gamma_i + \theta_t + \varepsilon_t$$

Where:

Pov	Poverty rate of governorates
Gov	Total governments expenditures to governorates per capita.
Health	Health government expenditures to governorates per capita.
Edu	Education government expenditure to governorates per capita.
Social	Social government expenditures to governorates per capita.
GRP	Gross Regional Product
Unemp	Unemployment rate of governorates

Results at the national level show that the total government spending, health spending, education spending has no significant impact on poverty in Egypt. In contrast, social spending has a significant negative effect. Gross regional product has a significant negative impact on poverty where unemployment rate has no significant impact.

Considering the differences between Egypt's regions using the dummy variable technique as discussed before, we found that total government spending, health spending, education have a significant negative impact on poverty in Greater Cairo region, Central Upper Egypt region, and

Southern Upper region. However, social spending has a significant negative impact in four regions: Greater Cairo region, North Upper Egypt, Central Upper Egypt, and Southern Upper Egypt.

This could be explained considering the economic distribution of expenses (figure.5). The largest share of social spending is on subsidies, grants, and social benefits, which could affect people's income in a very direct way as it is targeting the low income people basically. Also, the insignificant impact of health and education spending on poverty might be due to the large share of their expenses that is spent on wage and compensation where the unemployment rate is not an influential factor to poverty reduction as found.

Upper Egypt's governorates could be considered the most influenced area by government expenditures. This might be due to the increasing expenses that target Upper Egypt governorates; for example, about 72% of the total expenses on social solidarity transfers and the *Takaful* and *Karama* program[1] are allocated to Upper Egypt governorates (The Ministry of Finance, 2017).

6. Conclusion and Recommendations

Government spending is an essential factor that could help alleviate poverty in many ways. The different types of government spending and their economic distribution contribute to people's income and human capital formation directly and indirectly. To formulate a good strategy to fight poverty in Egypt, information about the most influential budget sectors on poverty is needed; also, the response of governorates poverty rates to the allocated government spending along with governorates demographic characteristics would help in determining the suitable policies to reduce poverty and inequality between regions.

Given the research results, we could say that targeting poverty reduction in Egypt requires intervention by increasing public spending allocated on social services as it appears to be the most influential type of government expenditure on poverty alleviation in Egypt. Studying

[1] *Takaful and Karama* is a program that provides conditional family income support aimed at increasing food consumption, reducing poverty, while encouraging families to keep children at school and providing them with needed health care.over the project's life (up till Jan 2018), TKP covered about 2.04 million HHs, representing more than 10% of the population and about 40% of the poor (UNICEF, 2018)

the impact of other government spending types on poverty reduction would enhance the budget role in alleviating poverty in Egypt.

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Appendix

Table (1): Total governorate expenditure and Poverty rate results:

Dependent variable: *ln Poverty rate*

Method: *2-Way Fixed Effects Model with white robust standard error.*

	Reg (1)	***Reg (2)***	***Reg (3)***	***Reg (4)***	***Reg (5)***	***Reg (6)***	***Reg (7)***	***Reg (8)***
		Greater Cairo Region	Alexandria Region	Canal Region	Delta Region	North Upper Egypt Region	Central Upper Egypt Region	Southern Upper Egypt
ln Total Exp. per capita	-0.0405 [-0.636]	0.0463 [1.275]	-0.2079 [-2.263]**	-0.0632 [-0.882]	0.0167 [0.581]	0.0158 [0.582]	0.1723 [2.204]**	0.0504 [2.128]**
*ln Total Exp. * dummy region*		-0.5776 [-3.492]***	0.5793 [6.515]***	0.3447 [1.381]	0.0065 [0.063]	-0.0867 [-0.644]	-0.4744 [-5.704]***	-0.7340 [-7.453]***
ln GRP per capita	-0.1299 [-2.053]**	-0.1561 [-2.510]**	-0.1392 [-2.028]**	-0.1651 [-2.806]***	-0.1462 [-2.377]**	-0.1450 [-2.339]**	-0.1829 [-2.651]***	-0.1138 [-2.027]**
ln Unemployment rate	-0.1287 [-1.697]*	-0.1292 [-1.633]	-0.1654 [-2.967]***	-0.0621 [-0.923]	-0.1215 [-1.633]	-0.1200 [-1.593]	-0.1024 [-1.588]	-0.0693 [-1.083]
Constant	5.0201 [6.913]***	8.5134 [5.589]***	6.3043 [15.49]***	5.3619 [5.160]***	4.8012 [7.273]***	4.7902 [7.225]***	4.1201 [12.36]***	4.1026 [7.146]***
				Weighted Statistics				
Adjusted R^2	49.4%	50.9%	56.1%	51.5%	48.7%	48.8%	52.1%	53.9%
Fisher test (F-stat.)	(9.689)***	(9.538)***	(11.53)***	(9.724)***	(8.824)***	(8.832)***	(9.962)***	(10.65)***
Post-hoc Statistical power	98.4%	98.4%	98.4%	98.4%	98.4%	98.4%	72.9%	72.9%

***Note*:** - ***, **, * indicate significance at 1%, 5% and 10% respectively.

- The dummy variables results for the geographical regions were not disclosed.

Table (2): Health governorate expenditure and Poverty rate results:

Dependent variable: *ln Poverty rate*

Method: *2-Way Fixed Effects Model with white robust standard error.*

	Reg (9)	***Reg (10)***	***Reg (11)***	***Reg (12)***	***Reg (13)***	***Reg (14)***	***Reg (15)***	***Reg (16)***
		Greater Cairo Region	Alexandria Region	Canal Region	Delta Region	North Upper Egypt Region	Central Upper Egypt Region	Southern Upper Egypt
ln Health Exp. per capita	0.0101 [0.169]	0.0060 [0.109]	-0.2037 [-1.695]*	-0.0274 [-0.534]	0.0106 [0.179]	0.0096 [0.169]	0.0876 [1.210]	0.0561 [1.088]
*ln Heal. Exp. * dummy region*		-0.2806 [-1.837]*	0.4729 [4.400]***	0.1427 [1.055]	-0.0086 [-0.106]	-0.0727 [-0.751]	-0.4274 [-10.34]***	-0.3932 [-9.283]***
ln GRP per capita	-0.1450 [-2.204]**	-0.1442 [-2.244]**	-0.1242 [-1.671]*	-0.1516 [-2.435]**	-0.1448 [-2.199]**	-0.1434 [-2.163]**	-0.1652 [-2.393]**	-0.1326 [-2.009]**
ln Unemployment rate	-0.1219 [-1.568]	-0.1282 [-1.569]	-0.1715 [-2.671]***	-0.0845 [-1.172]	-0.1209 [-1.534]	-0.1195 [-1.516]	-0.1093 [-1.603]	-0.0783 [-1.114]
Constant	4.8512 [7.125]***	6.2116 [5.099]***	5.7658 [11.61]***	4.9982 [6.347]***	4.8446 [7.009]***	4.8305 [6.962]***	4.6629 [8.165]***	4.3875 [6.840]***
				Weighted Statistics				
Adjusted R^2	49.3%	49.5%	55.4%	49.6%	48.7%	48.8%	51.5%	52.2%
Fisher test (F-stat.)	(9.667)***	(9.067)***	(11.23)***	(9.103)***	(8.823)***	(8.839)***	(9.742)***	(9.991)***
Post-hoc Statistical power	81.2%	81.2%	81.2%	81.2%	81.2%	81.2%	81.2%	81.2%

***Note*:** - ***, **, * indicate significance at 1%, 5% and 10% respectively.

- The dummy variables results for the geographical regions were not disclosed.

Table (3): Education governorate expenditure and Poverty rate results:

Dependent variable: *ln Poverty rate*

Method: *2-Way Fixed Effects Model with white robust standard error.*

	Reg (17)	***Reg (18)***	***Reg (19)***	***Reg (20)***	***Reg (21)***	***Reg (22)***	***Reg (23)***	***Reg (24)***
		Greater Cairo Region	Alexandria Region	Canal Region	Delta Region	North Upper Egypt Region	Central Upper Egypt Region	Southern Upper Egypt
ln Education Exp. per capita	0.0834 [1.332]	0.0987 [1.717]*	-0.0798 [-0.658]	-0.0447 [-0.635]	0.0837 [1.333]	0.0835 [1.343]	0.2947 [1.987]*	0.0945 [1.555]
*ln Edu. Exp. * dummy region*		-0.7473 [-3.468]***	0.4298 [5.254]***	0.4908 [2.013]**	-0.0187 [-0.259]	-0.0152 [-0.109]	-0.5884 [-4.286]***	-0.5799 [-8.963]***
ln GRP per capita	-0.1571 [-2.453]**	-0.1621 [-2.623]**	-0.1586 [-2.343]**	-0.1734 [-3.095]***	-0.1571 [-2.446]**	-0.1569 [-2.468]**	-0.1910 [-2.828]***	-0.1454 [-2.299]**
ln Unemployment rate	-0.1225 [-1.624]	-0.1332 [-1.615]	-0.1395 [-2.141]**	-0.0923 [-1.207]	-0.1219 [-1.621]	-0.1219 [-1.589]	-0.1239 [-1.657]	-0.1012 [-1.386]
Constant	4.5266 [8.908]***	9.0439 [5.291]***	5.5665 [14.69]***	5.3848 [5.279]***	4.5229 [8.911]***	4.5235 [8.822]***	3.6082 [16.97]***	4.2858 [8.909]***
				Weighted Statistics				
Adjusted R^2	49.6%	51.3%	52.4%	53.9%	49.1%	49.1%	54.1%	51.4%
Fisher test (F-stat.)	(9.784)***	(9.681)***	(10.04)***	(10.63)***	(8.932)***	(8.937)***	(10.69)***	(9.716)***
Post-hoc Statistical power	81.2%	81.2%	81.2%	81.2%	81.2%	81.2%	81.2%	81.2%

***Note*:** - ***, **, * indicate significance at 1%, 5% and 10% respectively.

- The dummy variables results for the geographical regions were not disclosed.

Table (4): Social governorate expenditure and Poverty rate results:

Dependent variable: *ln Poverty rate*

Method: *2-Way Fixed Effects Model with white robust standard error.*

	Reg (25)	***Reg (26)***	***Reg (27)***	***Reg (28)***	***Reg (29)***	***Reg (30)***	***Reg (31)***	***Reg (32)***
		Greater Cairo Region	Alexandria Region	Canal Region	Delta Region	North Upper Egypt Region	Central Upper Egypt Region	Southern Upper Egypt
ln Social Exp. per capita	-0.0704 [-4.905]***	-0.0723 [-4.819]***	-0.1728 [-2.522]**	-0.1266 [-2.317]**	-0.0801 [-5.652]***	-0.0699 [-6.324]***	0.0086 [0.236]	-0.0112 [-0.548]
*ln Soc. Exp. * dummy region*		-0.3346 [-3.399]***	0.5051 [12.12]***	0.1784 [1.004]	0.1363 [0.937]	-0.0163 [-0.080]	-0.3112 [-7.059]***	-0.3115 [-9.947]***
ln GRP per capita	-0.1806 [-2.981]***	-0.1714 [-2.891]***	-0.1542 [-2.137]**	-0.1939 [-3.115]***	-0.1778 [-3.203]***	-0.1811 [-3.079]***	-0.2103 [-3.252]***	-0.1596 [-2.642]***
ln Unemployment rate	-0.0829 [-1.901]*	-0.0811 [-1.849]*	-0.0932 [-3.118]***	-0.0557 [-1.413]	-0.0838 [-1.887]*	-0.0829 [-1.889]*	-0.0821 [-1.835]*	-0.0379 [-1.039]
Constant	5.3745 [8.630]***	6.1040 [7.892]***	5.3861 [9.628]***	5.5777 [7.488]***	5.3708 [9.035]***	5.3778 [8.746]***	5.4877 [8.914]***	4.8903 [8.055]***
				Weighted Statistics				
Adjusted R^2	69.9%	69.9%	73.5%	70.8%	69.7%	69.5%	71.3%	71.4%
Fisher test (F-stat.)	(13.41)***	(12.85)***	(15.12)***	(13.34)***	(12.71)***	(12.63)***	(13.68)***	(13.69)***
Post-hoc Statistical power	81.2%	81.2%	81.2%	81.2%	81.2%	81.2%	81.2%	81.2%

***Note*:** - ***, **, * indicate significance at 1%, 5% and 10% respectively.

- The dummy variables results for the geographical regions were not disclosed.

$$\ln Poverty = \underset{(3.137)***}{3.705} + \underset{(0.250)}{0.057}\ln Health_C + \underset{(1.558)}{0.229}\ln Edu._C - \underset{(-2.052)**}{0.255}\ln Social_C - \underset{(-2.171)**}{0.139}\ln GRP_C - \underset{(-0.908)}{0.068}\ Unemp.$$