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Perpetuating regional inequalities in Lebanon's infrastructure: The role of public investment

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About the author

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Executive Summary

Lebanon has some of the poorest quality public infrastructure in the world. This deficiency is particularly acute in least developed regions of the country such as Baalbek-Hermel or Akkar. Electricity, roads, waste management, and water supply are among the most unequally distributed services in terms of geography. Such a gap in infrastructure perpetuates regional inequalities in income and the wellbeing of the population. In recent years, government investment, both at the local and central level, has widened the infrastructure gap between leading and lagging districts, eroding the constitutional principle of equitable territorial development. This pattern is expected to continue in coming years. While economic growth does not need to be balanced, public institutions should aim at homogenizing living standards across regions, facilitating access to health and education services for the entire population, as well as enhancing mobility to and from regions where jobs are more available.

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For example, the World Economic Forum's Global Competitiveness Index ranks Lebanon at 130 out of 137 countries in quality of infrastructure based on experts' reviews.

Introduction

The steady deterioration of public infrastructure in Lebanon over the past few decades has positioned the country at the bottom globally in terms of quality of infrastructure.¹ Not only is infrastructure underperforming but there are wide geographic variations regarding access and quality that perpetuate economic inequalities and affect the living standards of citizens across different parts of the country.

Economic activity and populations tend to cluster geographically, starting in places with geographical advantages such as ports and rivers. Such agglomeration increases efficiency and economic growth. Infrastructure can reinforce these patterns by attracting activity, connecting markets, and enhancing agglomeration. However, geographic inequality is concerning for two reasons:

... the public utility **Electricité du Liban (EdL)** suffers from persistent budget deficits and profound deficiencies in electricity supply that result in frequent blackouts

On the one hand, a sizeable portion of inequality among citizens in a given country is driven by their geographic location irrespective of their personal characteristics. On the other hand, spatial

inequality can be of further concern in countries fragmented across sectarian lines, such as Lebanon. As a result, different groups might have access to different resources and living standards.

In Lebanon, least developed regions also suffer from weaker infrastructure networks. Not only do they have lower employability, salaries, and income, but also more limited access to and poorer quality of public services such as electricity, roads, solid waste management, education, or health.

Geographic disparities in electricity

Electricity is one of the most underperforming types of infrastructure in Lebanon, as the public utility **Electricité du Liban (EdL)** suffers from persistent budget deficits and profound deficiencies in electricity supply that result in frequent blackouts. However, these disruptions affect different regions in an

Given the unequal supply of electricity, shortages appear far more frequently in poorer regions

uneven way—a direct result of uneven infrastructure investment throughout Lebanon. According to 2004 data from

the Council for Reconstruction and Development (CDR),² the electricity supply and distribution capacity in Beirut is ten times superior to that of lagging regions in the southeast (figure 1). In addition to Beirut, the neighboring districts in Mount Lebanon have the highest capacity in terms of electricity provision.

Given the unequal supply of electricity, shortages appear far more frequently in poorer regions. While Beirut residents suffer from public network electricity cuts that last, on average, three hours per day, they account for nearly half

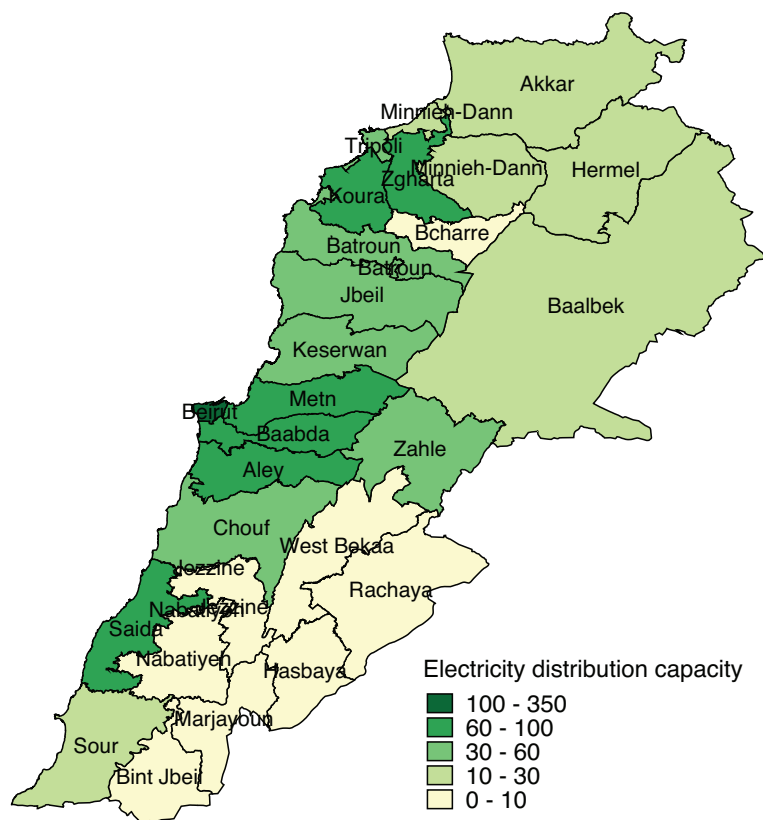
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National Physical Master Plan of the Lebanese Territory.

a day in the south and Nabatiyeh, and ten hours per day in the north, Akkar, and the Bekaa.³ Most citizens who can afford a private generator or a subscription to a generator purchase it to fill in the gaps in the public system. As such subscriptions cost more than electricity provided by EdL, the greatest burden resulting from poor electricity infrastructure falls on the poorest citizens living in lagging regions.

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World Bank. 2015. 'Lebanon Economic Monitor: The Economy of New Drivers and Old Drags.' Spring.

Figure 1

Electricity distribution capacity in Lebanon



Source Council for Reconstruction and Development's National Physical Master Plan of the Lebanese Territory, 2004.

Road networks

Regarding road infrastructure, the public network in peripheral regions is less developed and in much poorer condition compared to other regions. The two main highways in Lebanon traverse the coast from Tripoli to Sour, passing through the main coastal cities, and connect Beirut to Damascus. The road network follows agglomeration patterns, with more density in districts with higher economic activity and population. Beirut has, by far, the largest density of roads, with 6 km of roads per square kilometer of surface area (figure 2), followed by Tripoli and the greater Beirut area (around Baabda and Metn) with slightly above 1 km of road per square kilometer. The coastal areas tend to have a higher density of roads than inner districts. The least developed

In order to provide a general overview of the state of infrastructure disparities across districts, we constructed an index of infrastructure (II) as the simple average of the three sub-indices for the electricity, roads, and water sectors, for which data is disaggregated regionally. The three variables were combined by: (1) Transforming the raw indicators into comparable units—through a process of standardization;⁷ (2) averaging the transformed scores of all indicators; and (3) re-scaling the final score so the average is 50 and the maximum is 100.⁸ In spite of its limitation given data constraints, the infrastructure index shows large geographical disparities. It ranks Lebanese districts into five categories (figure 3), from most developed to least developed infrastructure, although even the best performing district, Beirut, still lags behind when compared to benchmark countries:

- (a) Most developed infrastructure: Mostly the greater Beirut area.
- (b) Above average infrastructure development: The rest of Mount Lebanon and other major cities such as Tripoli, Saida, and their surroundings.
- (c) Average development of infrastructure: Zahle in the Bekaa, Nabatiyeh, Sour, Marjayoun in the South, and Batroun and Bcharre in the North.
- (d) Low development: Southeast districts of West Bekaa, Rachaya, Hasbaya, Jezzine, and Bint Jbeil.
- (e) Least developed infrastructure: North and northeast districts of Akkar, Minnieh, Hermel, and Baalbek.

Although access to water sources is almost universal in Lebanon, there are serious management deficiencies that raise safety and reliability concerns

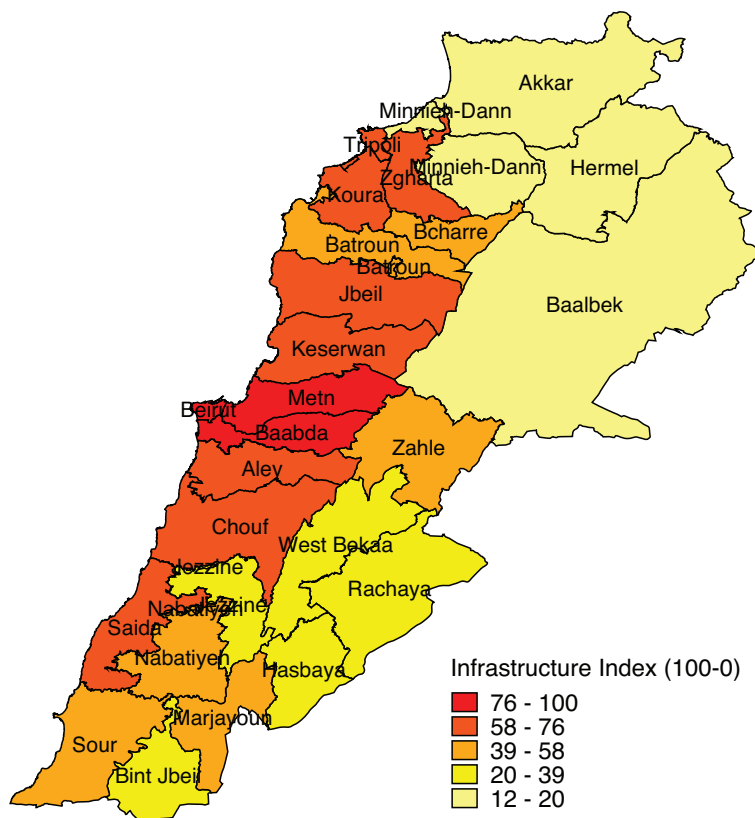
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By subtracting the mean and dividing by the standard deviation.

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A II score greater (lower) than 50 shows a higher (lower) than average level of infrastructure in Lebanon. A score of 100 indicates that the district has the most developed infrastructure in the country. However, even the most developed district lags behind the best performing countries given the overall low infrastructure network and quality in Lebanon.

Figure 3

Infrastructure Index for Lebanese districts (0 worst - 100 best)

Source CAS' Multiple Indicator Cluster Survey, 2009; CDR's National Physical Master Plan of the Lebanese Territory, 2004; Open Street Maps, 2017; World Bank, 2015.

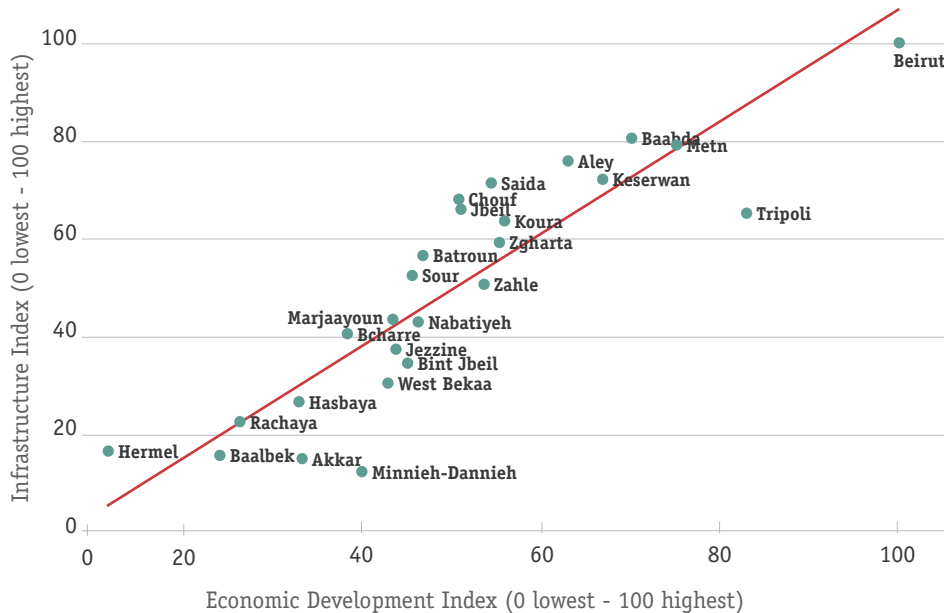
... public investments in a region are associated with higher economic growth, connecting markets, and increasing the private returns of firms

As expected, there is a high correlation between the state of public infrastructure in a district and its level of economic development. The more economic development in a district, the more resources there are to invest in improving

its infrastructure. Also, public investments in a region are associated with higher economic growth, connecting markets, and increasing the private returns of firms. This

bi-directional correlation between infrastructure and economic activity is observed in Lebanon, with Beirut benefiting from both the most developed infrastructure and greatest economic activity, while the opposite is true for underdeveloped districts such as Hermel, Baalbek, and Akkar. Minnieh-Danniyeh exhibits the most underperforming infrastructure given its level of economic development.

Figure 4

Correlation between infrastructure index and level of economic development

Source CAS' Multiple Indicator Cluster Survey, 2009; CDR's National Physical Master Plan of the Lebanese Territory, 2004; Satellite data VIIRS DNB Cloud-Free Composites from National Oceanic and Atmospheric Association (NOAA), 2017; Open Street Maps, 2017; World Bank, 2015.

Beyond these infrastructure gaps, other key public services show fewer disparities, such as the supply of public education and health services. For example, the less wealthy districts of Hasbaya and Rachaya have some of the largest number of public schools per capita, and Zgharta has one of the higher rates of availability of beds in public hospitals per resident.⁹ However, the main concern in these two sectors is that they are largely privatized,¹⁰ with wide quality gaps between private and public services. Given the higher reliance on public services in less wealthy districts, residents in those areas—in particular those with lower income—have access to lower quality education and health than those in Beirut and Mount Lebanon. In the academic year 2016/2017, 95% of grade nine students in Kesrouan passed the Brevet official exam, compared to only 74% in Hermel. This gap is driven by the prevalence of private-public schooling, with only 8% attending public centers in the former compared to 57% in the latter.

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⁹ Data from the Ministry of Education and Higher Education (2017) and the CDR's National Physical Master Plan for the Lebanese Territory (2004).

¹⁰ For example, public health represents less than half of the total health expenditure in Lebanon (47%) compared to the world average of 60% or 63% in the Arab region. Also, only 28% of students are enrolled in public schools.

The government's role in addressing spatial inequalities

There is a broad consensus in Lebanon regarding the need to upgrade public infrastructure in order to reduce its gap with comparative countries, promote growth, and improve the standards of living of its population. However, there is more debate over the country's geographical allocation of resources

and investment—a tension that is now at the forefront given limited fiscal space, which reduces capacity to carry out public investment projects.

Investment in infrastructure can be a powerful tool for promoting regional development, one which can be employed by the central government to boost lagging regions. The CDR's National Physical Master Plan for the Lebanese Territory (2004) highlights as one of its key goals '[alleviating] the disparities of development between regions by implementing a modern and objective perception of a fair and equitable development,' in line with a constitutional

... geographical allocation of public investment in infrastructure faces a trade-off between 'spatial efficiency' (investing in the regions that yield the highest returns), and 'spatial equity' (investing in lagging regions to reduce infrastructure gaps)

principle. At the same time, the CDR also pursues the objective of increasing productivity and economic growth. However, geographical allocation of public investment in infrastructure faces a trade-off between 'spatial efficiency' (investing in the regions that yield the highest

returns), and 'spatial equity' (investing in lagging regions to reduce infrastructure gaps).¹¹ In particular, wealthier regions might have higher returns due to complementarities between infrastructure, private capital, and human capital.¹² In this sense, investment in infrastructure could actually increase income inequality.

A common policy prescription among international organizations such as the World Bank is allowing geographically unbalanced economic growth while also making investments aimed at reducing regional disparities in living standards. In order to do so, the World Bank (2008)¹³ discourages investment aimed at promoting economic activity in lagging regions, but advocates allocating investments to improve those regions' health and education levels, along with facilitating mobility to most developed regions (economic integration). This can be done by connecting different areas through a higher quality transport network.

Current public investment exacerbates spatial inequalities

Public investment shapes the evolution of quality of public infrastructure over time and determines whether there is convergence or divergence between regions. It is carried out either by central or local authorities, although the latter play a smaller role in channeling investments, given their more limited financial capacity.¹⁴

Despite municipal budget constraints, there are wide geographical variations with more economically dynamic localities having higher revenue capacity, and thus, benefiting from a larger fiscal space to invest. Based on our own calculation using Ministry of Interior and Municipalities data, figure 5 shows

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There is wide empirical evidence of these trade-offs, for example, Lall, S., E. Schroeder and E. Schmidt. 2014. 'Identifying Spatial Efficiency-Equity Trade-offs in Territorial Development Policies: Evidence from Uganda,' *Journal of Development Studies*, 50(12).

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Bajar, S. and M. Rajeev. 2015. 'The impact of infrastructure provisioning on inequality: evidence from India,' ILO and Global Labour University Working Paper No. 35.

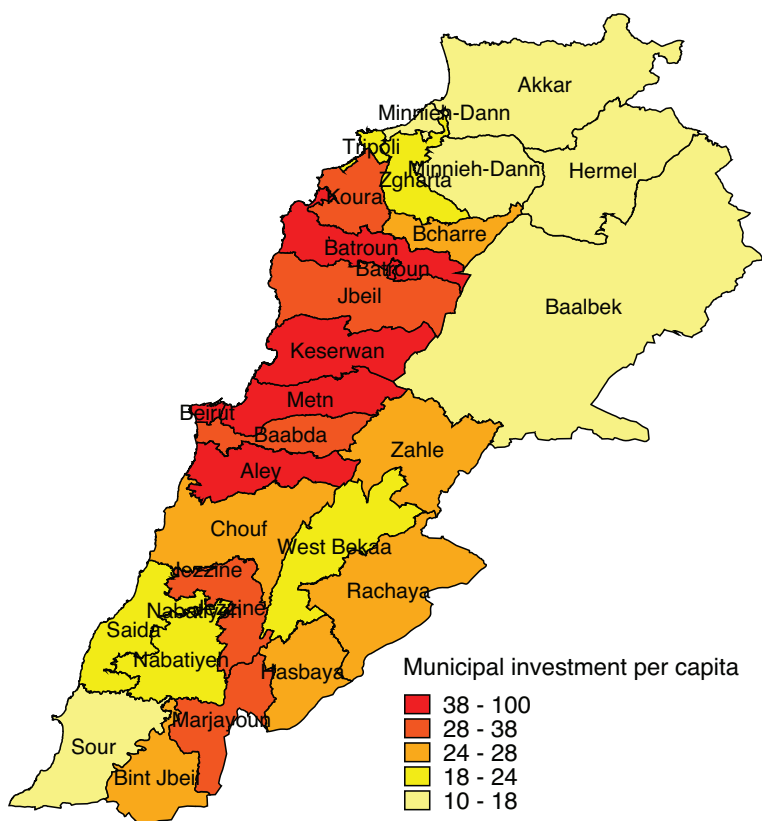
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World Bank. 2008. 'World Development Report 2009: Reshaping Economic Geography.'

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Out of the approximately \$0.95 billion of public investment in 2015, central authorities, mostly CDR, invested about \$0.8 billion compared to \$0.15 billion by all municipalities in the country (own calculations based on MIM and CDR).

that while Beirut invests nearly \$100 per resident annually on maintaining and improving public infrastructure in the city, municipalities in the districts of Hermel, Minnieh-Dannieh, and Akkar only invest \$10 - \$15 per person—that is, six to ten times less. Therefore, limited revenue capacity, while widespread, particularly affects poorer peripheral districts, limiting their ability to invest in necessary infrastructure projects such as municipal roads, solid waste management, or lighting.

Figure 5

Approximate public investment per capita by municipalities in 2015



Source **Ministry of Interior and Municipalities (2017)** and **Ministry of Health (2015)**.

Moreover, public infrastructure investment projects commissioned by CDR in recent years have been widening regional disparities. Based on CDR data for 2017, four of the five largest beneficiaries of CDR projects with respect to their population are districts with already more developed infrastructure—Beirut (\$165 per resident), Chouf (\$181 per resident), Jbeil (\$184 per resident), and Batroun (\$250 per resident)—while no CDR funds were specifically allocated to the underdeveloped districts of Rachaya, Bint Jbeil, or Jezzine, and only \$40-\$50 per resident in Baalbek and Akkar (figure 6). Considering all active

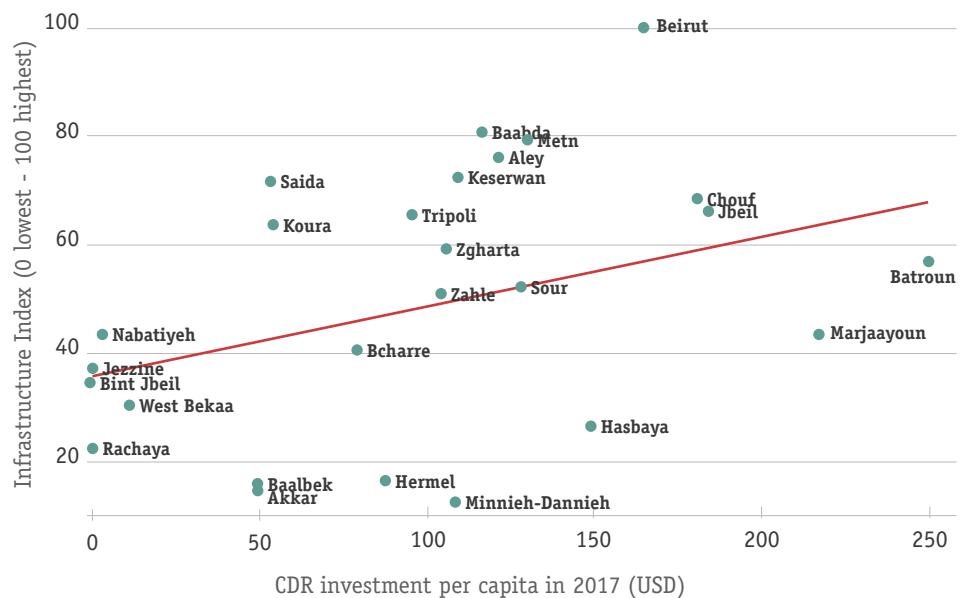
Overall, public investment rather than being redistributive in nature, increases the infrastructure gap between leading and lagging districts

projects in 2017—covering a time period spanning 2002 to 2022—the pattern is very similar, with the periphery receiving fewer funds than Beirut and Mount Lebanon.

Overall, public investment rather than being redistributive in nature, increases the infrastructure gap between leading and lagging districts. As figure 6 highlights, districts with historically higher levels of infrastructure have on average received larger public investment in recent years, which has accentuated their leading position.

Figure 6

Correlation between levels of infrastructure per district and CDR investment per capita in 2017



Source CAS – MIC survey (2009), Council for Development and Reconstruction (2017), Ministry of Health (2015), NPMPLT (2004).

... insufficient current and future investments in poorer areas will perpetuate spatial disparities in infrastructure across Lebanon as well as inequality in living standards among residents in different regions

Looking at public investment projected over the coming years, the government's investment plan for 2018-2030 projects a total investment of about \$23 billion, the equivalent of 2.4% of GDP annually. The vast majority will

be channeled to water and sanitation (\$7.5 billion), roads (\$7.4 billion), and electricity (\$5.6 billion). Geographically, projected investments do not address regional infrastructure disparities overall, as they are at least as large in regions

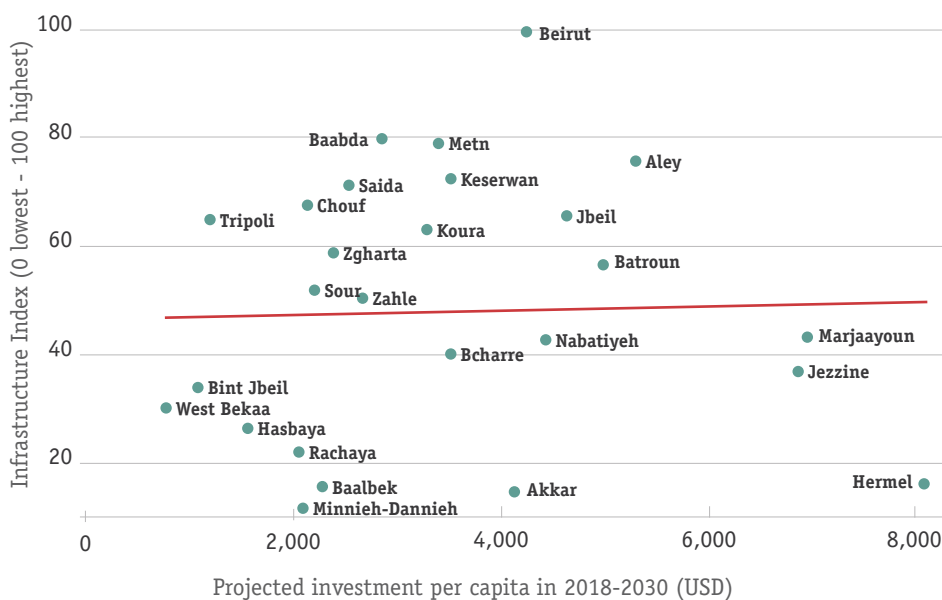
with more developed infrastructure than in least developed regions (figure 7). Among poor-infrastructure districts, Hermel has the highest projected

investment per capita, with \$8,000 per person during the next thirteen years—mostly due to high investment in the Al Assi dam.¹⁵ Jezzine and Marjayoun are also expected to receive higher than average investments. However, there are other poorer districts that will benefit from some of the lowest investment per capita, such as West Bekaa, Bint Jbeil, Hasbaya, or Rachaya. By sector, there are different geographic dynamics: Lagging regions will receive higher public investment in water, but lower investment in electricity, roads, and telecommunications, and neutral in sanitation. Overall, insufficient current and future investments in poorer areas will perpetuate spatial disparities in infrastructure across Lebanon as well as inequality in living standards among residents in different regions.

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The project has a budget of \$365 million, 75% of the total infrastructure budget (\$488 million) in Hermel.

Figure 7

Projected public investment per district for the years 2018-30



Source Capital investment plan 2018-30, government of Lebanon.

Conclusion

Economic growth and prosperity do not need to develop homogeneously throughout the country, but no districts in Lebanon should be left behind in terms of poverty and wellbeing of its population. Investment in equal access to quality services such as health, education, waste management, and electricity should be undertaken in order to homogenize people's living standards across the country. Unfortunately, Lebanon's low and uneven public investment in infrastructure perpetuates regional disparities and prevents its

Investment in equal access to quality services such as health, education, waste management, and electricity should be undertaken in order to homogenize people's living standards across the country

citizens from enjoying similar standards of living. Public investment in roads, electricity, and sanitation has been significantly higher in Beirut and Mount Lebanon. Also, public investment in education and health is very low in Lebanon and there are large quality gaps between private and public services that perpetuate health and education disparities. Wealthier regions that rely more on costlier but better quality private services perform better than lagging regions where citizens use more poor-performing public services. Overall, government policies have not only been insufficient to equalize incomes across regions but have also failed to provide similar living standards to its citizens—a pattern that is expected to continue in the coming years. Therefore, it is important to bring the issue of regional inequality to the infrastructure agenda in order to adhere to the constitutional principle of equitable territorial development.

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