EMPLOYMENT GENERATION IN EGYPT:
A SPATIAL APPROACH
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Abstract

Using a spatial approach, this study analyzes the distribution of Egypt's labour force across its twenty seven governorates, and the rate of unemployment in each governorate by age, gender, and level of education. At the national level, Egypt's most pressing unemployment problem is among the holders of intermediate education, followed by youth, male and female unemployment, and among holders of university degrees and above. At the governorate level, the highest problems were found in: Behera, Sharkia, Gharbia, Suhag, Alexandria, Cairo, Dakahlia, Menia, Asyout, and Faiyum. The study then identifies possible sources of the problem(s), including investment patterns and energy subsidies that created a heavily capital and energy intensive industrial structure. Other sources relate to access to finance, and weak and heavily concentrated infrastructure investment favoring Greater Cairo and Alexandria. The study found evidence of misalignment between output of technical and vocational education and governorates' leading activities. Based on these findings, the study puts forth two sets of possible solutions. The *first* is cross-cutting, including facilitating access to finance especially for SMEs, phasing out energy subsidies, ensuring synergy between technical and vocational education and the governorates' leading activities, and raising infrastructure investments, particularly in infrastructure deficient governorates. The *second* set is governorate-specific and involves nominating manufacturing industries for potential investment as well as building on the mining/quarrying endowments of governorates. The governorate-specific solutions will be more effective if coupled with fiscal and administrative decentralization.

ملخص

تتناول هذه الدراسة بالتحليل توزيع قوة العمل عبر محافظات مصر السبعة والعشرين، فضلا عن معدل البطالة في كل محافظة بحسب العمر والنوع ومستوى التعليم، وذلك باستخدام المنهج المكاني. فعلى المستوى القومي، وجدت الدراسة أن مشكلة البطالة تتركز بين أصحاب التعليم المتوسط ثم الشباب والذكور والإناث وحاملي الشهادات الجامعية فأعلى، على التوالي. أما على مستوى المحافظات، فقد وجدت أن أكبر عدد من هذه المشاكل يتركز في محافظات البحيرة والشرقية والغربية وسوهاج والإسكندرية والقاهرة والدقهلية والمنيا وأسيوط والفيوم. وقد وجدت الدراسة أن هذه المشكلات ترجع لأسباب متعددة، أهمها: أنماط الاستثمار ودعم الطاقة والتي أدت إلى هيكل صناعي يتسم بكثافة رأس المال والطاقة؛ وصعوبة الحصول على التمويل؛ وضعف الاستثمار في البنية التحتية وتركزه بشدة في القاهرة الكبرى والإسكندرية. وذلك بالإضافة إلى وجود دلائل على الاختلال بين مخرجات التعليم التقني والمهني وبين الأنشطة الرائدة في المحافظات. وفي ضوء تلك النتائج، تطرح الدراسة مجموعتين من الحلول الممكنة. تضم المجموعة الأولى مقترحات شاملة غير موجهة لمحافظة بعينها، ومنها: تيسير الحصول على التمويل وخاصة للشركات الصغيرة والمتوسطة؛ والخفض التدريجي لدعم الطاقة؛ وضمان الاتساق بين التعليم التقني والمهني وبين الأنشطة الرائدة في المحافظات؛ وزيادة الاستثمار في البنية التحتية وخاصة في المحافظات التي تعاني نقصا في هذا الصدد. أما المجموعة الثانية من المقترحات فتخص حلول موجهة لكل محافظة على حدة لتساعد على تحديد الصناعات التحويلية التي يمكن تحفيز الاستثمار فيها، بالإضافة إلى استغلال الموارد التعدينية و الاستخراجية المتاحة فيها. وهذه الحلول الموجهة للمحافظات ستكون أكثر فاعلية إذا ما اقترنت بجهود من شأنها تحقيق اللامركزية المالية والإدارية.

I. INTRODUCTION

Unemployment is a structural economic problem in Egypt. Not only is it high in magnitude (amounting to 12.7 percent in 2011/2012, and 13.3 percent in 2012/2013), but there are also age-, gender-, and education-related sides to this problem. Age-wise, the youth (15-29) have the highest rate of unemployment (27.7 percent). Youth unemployment is heightened by the fact that the youth constitute 36.1 percent[1] of the labour force. Gender-wise, unemployment among males amounted to 8.8 percent, and among females to 23 percent (each relative to the male and female labour forces, respectively).[2] Education-wise, almost 80 percent of the unemployed are holders of 'intermediate level' education and 'university degrees or above.'

Although literature abounds in studies on the demographic characteristics of the labour force and of the unemployed in Egypt, a *spatial* approach to this problem is still much needed. In this study, we spatially analyze the distribution of Egypt's labour force across its twenty seven governorates, and each governorate's rate of unemployment from the 'age', 'gender', and 'education' angles. Such spatial analysis will help identify some of the main causes of each governorate's employment problems, in order to propose relevant solutions. Some of these solutions may be *cross-cutting* (as they relate to the macroeconomic environment, or the system of education in Egypt, among others), or *governorate-specific* (as they target de novo investments or the expansion of existing activities). The governorate-specific solutions proposed in this study will also take into account the physical and human resource endowments of the governorates. Our research effort is thus a step in the direction of "regional development on the basis of each region's innate strengths, comparative advantages, specific resource endowments, geographic characteristics and potential for development in social, economic and environmental terms" (DECLG 2010, 10; and PRSA 2006, 6).

The study therefore has a cross sectional scope, and it relies on the 'descriptive analysis' method. It draws upon data from the following sources: Annual Statistical Yearbook(s) issued by Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS); the Annual Labour Force Survey—Population and Employment Statistics (2011) issued by CAPMAS; and the Annual Industrial Survey (2009/2010) and (2010) issued by CAPMAS.

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[1] Calculated from CAPMAS Annual Statistical Yearbook (2012) based on Egypt's 2006 census.
[2] Calculated from CAPMAS Statistical Yearbook (2012).

The study is organized as follows: after the introduction, Section II gives an overview of employment/unemployment in Egypt, starting at the national level, and moving to the regional one. Section III probes the sources of the problems; Section IV proposes *cross-cutting* and *governorate-specific* solutions and concludes.

II. EGYPT'S LABOUR FORCE AND RATE OF EMPLOYMENT

In this section, we give an overview of employment/unemployment in Egypt at the *national* and *regional levels*. At the national level, we look at the size of Egypt's labour force, the overall rate of unemployment, and unemployment from the 'age', 'gender', and 'education' angles. Regional-level analysis includes the distribution of Egypt's labour force across its twenty seven governorates in 2011, and each governorate's rate of unemployment from the above same angles.

II.i. The National Outlook

In 2011/2012, Egypt's labour force amounted to 27.02 million,[3] of which 87.3 percent were employed, and 12.7 percent were unemployed. **Age-wise**, unemployment was highest among the youth (in the age bracket of 15-29) amounting to 27.7 percent, followed by those in the 30-49 age bracket (6.3 percent) (see Figure 1). Youth unemployment is heightened by the fact that the youth constitute 36.1 percent of the labour force (calculated from CAPMAS Annual Statistical Yearbook 2012 based on Egypt's 2006 census).

**Figure 1. Unemployment by Age Bracket, 2006-2012**
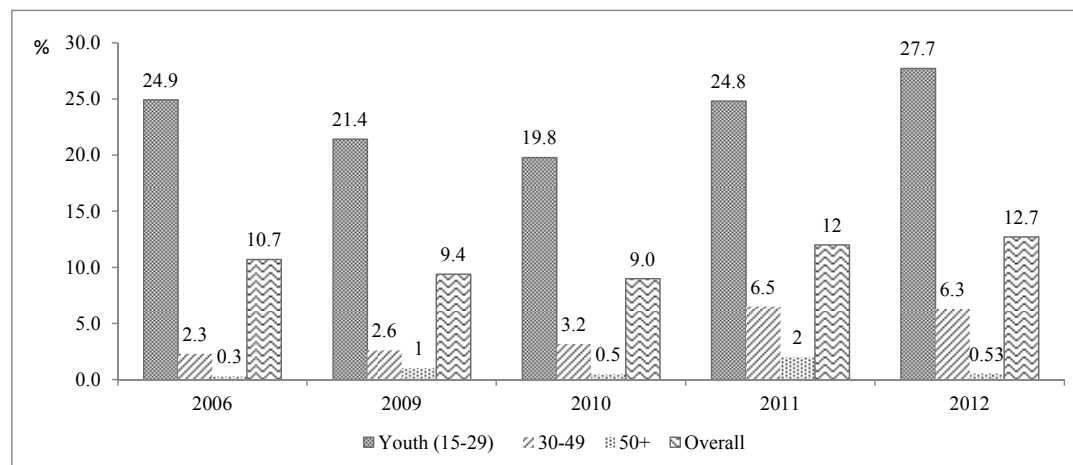
Source: Authors' calculations based on CAPMAS Annual Statistical Yearbook, 2006, 2009, 2011 and 2012.

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[3] Constituting 32.83 percent of its population.

Gender-wise, unemployment among males was 8.8 percent, and among females was 23 percent (relative to the respective male and female labour forces) (calculated from CAPMAS Statistical Yearbook 2012).

Education-wise, the unemployed were broken down as follows: 33.2 percent are holders of university degrees and above; 5.3 percent below university and above intermediate level[4], 46.6 percent intermediate level[5]; 8.7 percent below intermediate; 3.0 percent read and write; and 3.2 percent illiterate (calculated from CAPMAS Statistical Yearbook 2012). Figure 2 reflects the above breakdown in descending share of the total unemployed.

Figure 2. The Unemployed by Level of Education (in Descending Share), 2012
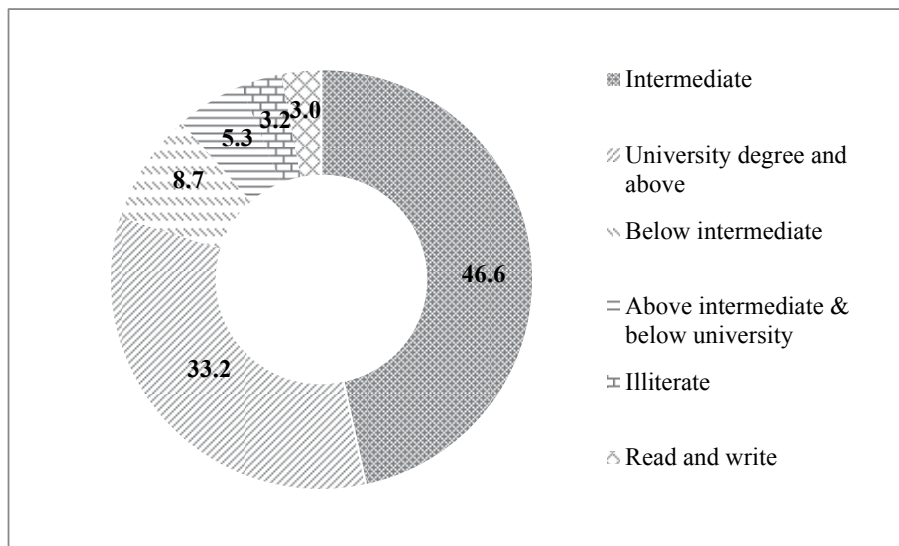
Source: CAPMAS Annual Statistical Yearbook (2012).

Figure 2 underscores that those with 'intermediate' and 'university and above' levels of education account for almost 80 percent of the unemployed.

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[4] *Below university above intermediate level* of education includes: first 2 years of a 3-year technical diploma; first 2 years of a 4-or-5-year university degree; 2-year higher technical institute.

[5] *Intermediate level of education includes*: 3-year secondary vocational; 3-year specialized secondary technical; 3-year apprenticeship; first 3 years of a 5-year secondary technical; 3-year secondary technical; 3-year general certificate of education.

II.ii. *The Regional Outlook*

a) *Compatibility of Share in Population and Share in Labour Force*

Our first step in regional analysis is to give a picture of the degree of compatibility between the share of Egypt's governorates in the labour force and their share in the population. Indeed, such compatibility was established (as shown in Figure 3). An interesting observation is that the average governorate share in the population and in the labour force is 3.7 percent.

Figure 3. Share of Governorates in the Population and the Labour force, 2011
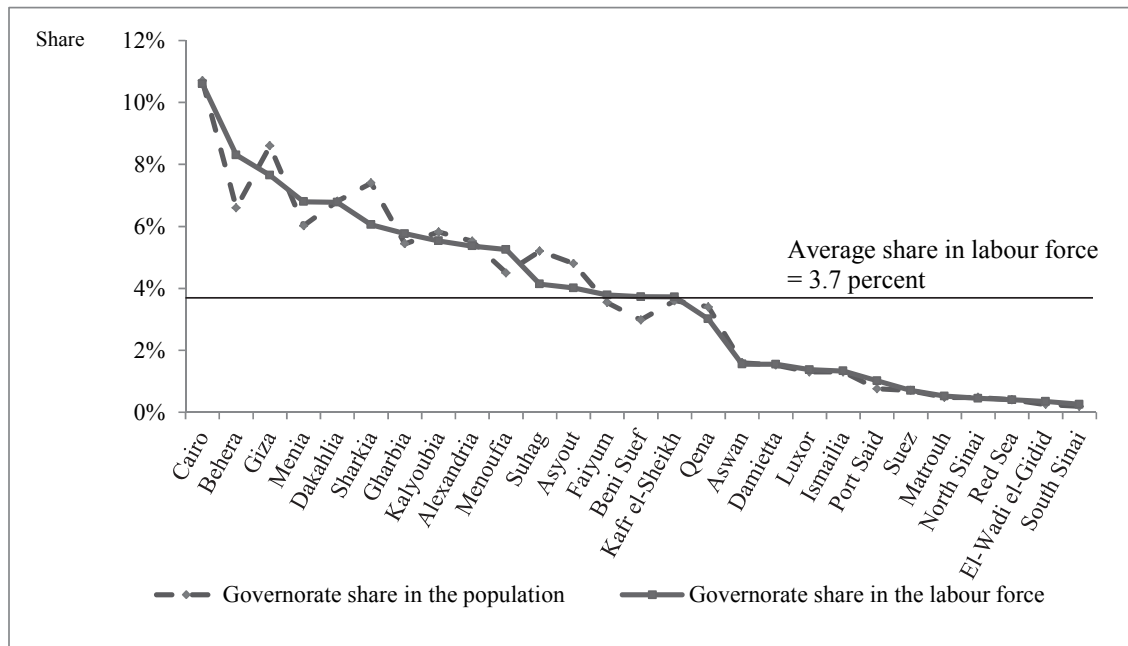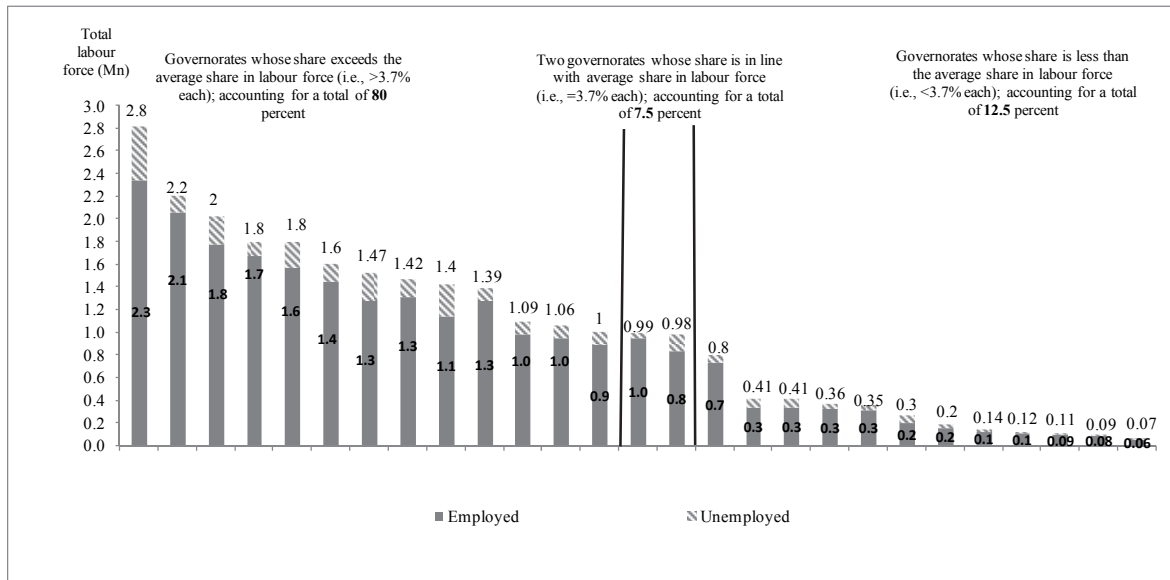

Source: Authors' calculations based on CAPMAS Annual Labour Force Survey – Population and Employment Statistics (2011) for labour force data; and CAPMAS Statistical Yearbook (2013) for estimates of mid-year population by governorate, 2012.

b) *Labour Force by Governorate, and the Employed and Unemployed in Each*

To complement the picture, Figure 4 shows the labour force by governorate, as well as the employed and unemployed in each. We note that, as shown in Figure 3 above, thirteen governorates have '*above-average-share*' and account for 80 percent of Egypt's labour force, Beni Suef and Kafr el-Sheikh are *at the average level*—both accounting for 7.5 percent, and the remaining twelve governorates are below average accounting for 12.5 percent.

**Figure 4. Governorate Labour Force and Their Respective Employed and Unemployed, 2011**

c) Governorates in Descending Rates of Unemployment (and their Distribution among Unemployed Youth and Unemployed All Other Ages)

Age-wise, Figure 5 below shows governorates arranged in descending rate of unemployment. The figure also shows the distribution of the unemployed among "youth" and "all other age brackets" in percent of total unemployed in the governorate. On average for all governorates, the **youth** constitute 75 percent of the unemployed.

Figure 5. Total Unemployed by Governorates Distributed among 'Youth' and 'All Other Age Brackets', 2011
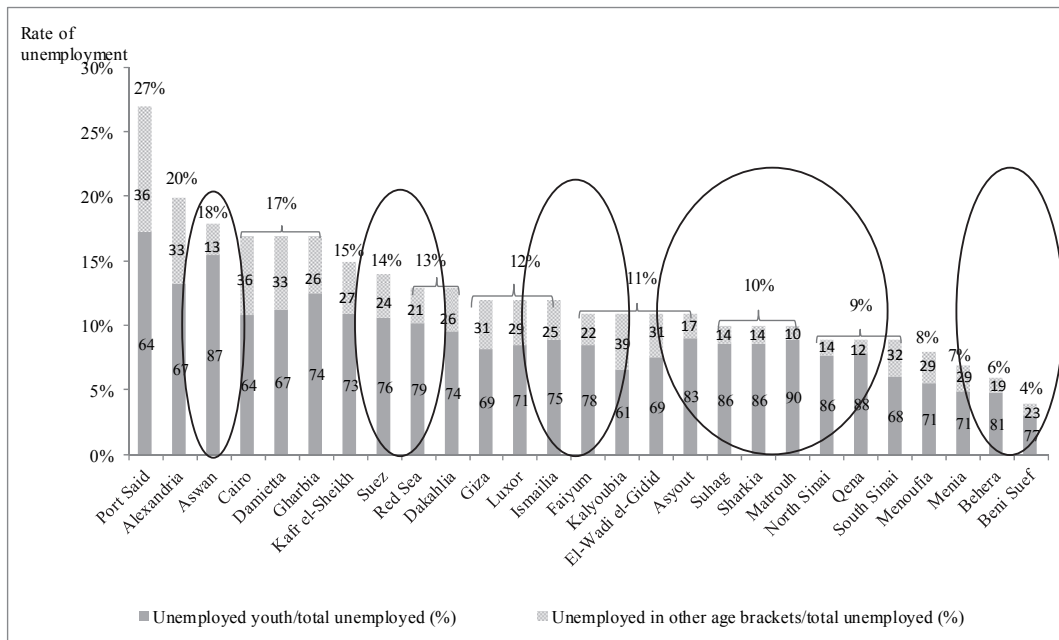
Source: Authors' calculations based on CAPMAS Annual Labour Force Survey—Population and Employment Statistics 2011.

Notes: The oval shape denotes governorates with above-average youth unemployment.

Thus, governorates with *above-average* rates of youth unemployment are: Aswan; Suez; Red Sea; Ismailia; Faiyum; Asyout; Suhag; Sharkia; Matrouh; North Sinai; Qena; Behera; Beni Suef, signaling a pronounced problem in this regard.

d) The Gender Perspective

Gender-wise, Figure 6 shows the composition of the labour force by governorate. On average for all governorates, the males constitute 77 percent of the labour force, and the females 23 percent.

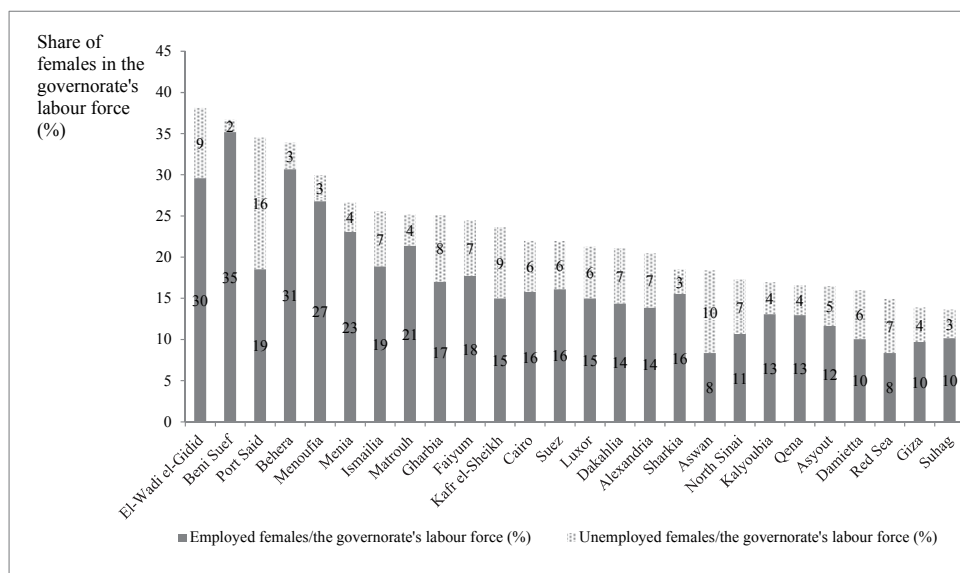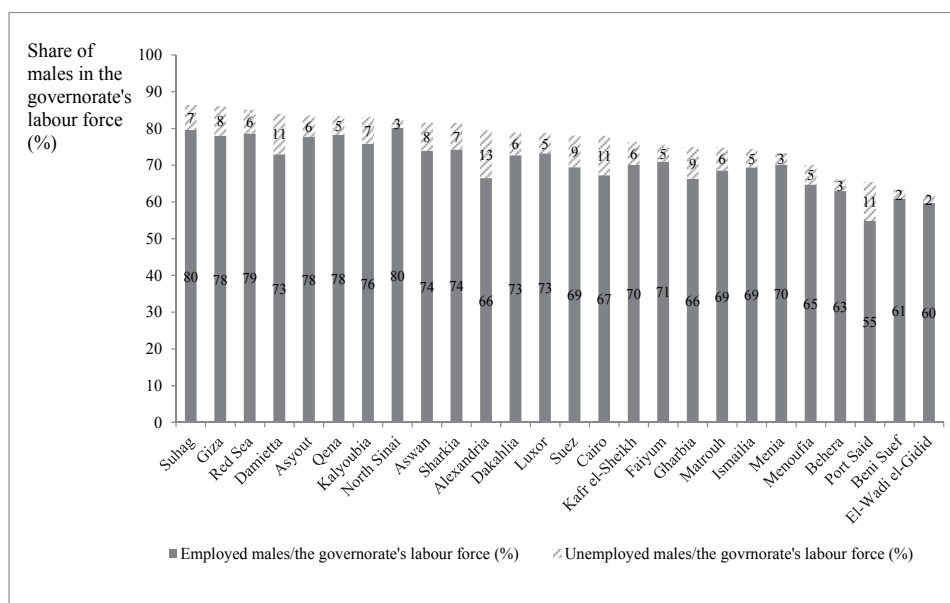**Figure 6. Gender Composition of the Labour Force by Governorate, 2011**
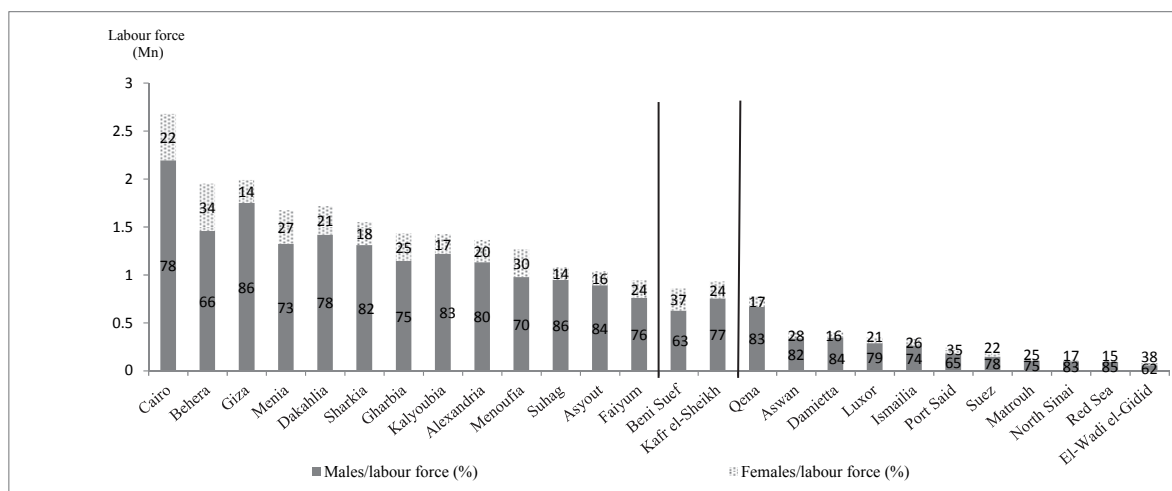
Source: Authors' calculations based on CAPMAS Annual Labour Force Survey—Population and Employment Statistics 2011.

Again to complement the gender picture, we arrange governorates by descending shares of males and females in their labour forces (shown in Figures 7a and 7b, respectively). The figures also show their distribution as employed and unemployed. We can distill that, on average, the unemployed males constitute close to 6.5 percent, while the unemployed females constitute 6 percent of the governorates' respective labour forces.[6] We therefore single out the following governorates as those with a male unemployment problem (in excess of average): Suhag, Giza, Damietta, Kalyoubia, Aswan, Sharkia, Alexandria, Suez, Cairo,[7] Gharbia and Port Said. Governorates with a female unemployment problem are: El-Wadi el-Gidid, Port Said, Menia, Gharbia, Faiyum, Kafr el-Sheikh, Dakahlia, Alexandria, Aswan, North Sinai, and Red Sea.

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[6] We note that the rate of female unemployment calculated here relates the unemployed females to the total labour force of the respective governorates, whereas the nation-wide rate of female unemployment of 23 percent (see II.i) relates the unemployed females among the female portion of the labour force.

[7] We take special note of *Cairo* because it already has the highest share in the total labour force (11 percent), coupled with a high share of males in its labour force, 10 percent of whom are unemployed.

Figures 7a, b. Shares of Males and Females in the Labour Forces of the Governorates of Egypt, 2011

Share of males in the governorate's labour force (%)

■ Employed males/the governorate's labour force (%)   ╱ Unemployed males/the govrnorate's labour force (%)

Share of females in the governorate's labour force (%)

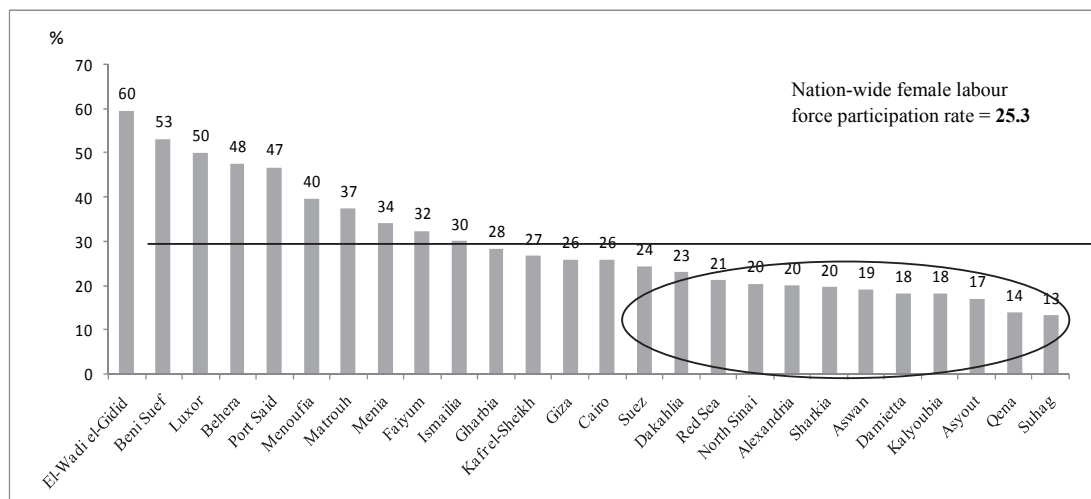■ Employed females/the governorate's labour force (%)   ▦ Unemployed females/the governorate's labour force (%)

Source: Authors' calculations based on CAPMAS Annual Labour Force Survey – Population and Employment Statistics 2011.

Another gender angle relates to the female labour force participation rate.[8] At the national level, the female labour force participation rate was found to be 23.8 percent in 2009 and 25.3 percent in 2011 (calculated from CAPMAS Annual Statistical Yearbook 2009;

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[8] The female labour force participation rate is defined as the ratio of women in the labour force (aged 15-65 years) to women in the population in the same age bracket.

2012).[9] Such a low participation rate signals that those women employed or actively looking for work constitute only 25 percent of the population of women in the 15-65 age bracket nation-wide. At the governorate level, Suez, Dakahlia, Red Sea, North Sinai, Alexandria, Sharkia, Damietta, Kalyoubia, Asyout, Qena and Suhag all fall below the low nation-wide female labour force participation rate denoted by the oval shape in the Figure 8.

Figure 8. Female Labour Force Participation Rate at the Governorate Level, 2011.

Source: Authors' calculations based on CAPMAS Statistical Yearbook 2012, and CAPMAS Annual Labour Force Survey – Population and Employment Statistics 2011.

We particularly take note of the governorates of El-Wadi el-Gidid and Port Said which show a high female labour force participation rate, coupled with a high rate of female unemployment (as shown in Figure 7b). This signals particular misuse of latent female resources because although women in the labour force have a relatively high share in the female population of the governorate, a high percentage of them are unemployed.

e) The Education Perspective

Education-wise, we now show the distribution of the unemployed by **level of education** in each governorate, aiming to expose whether the unemployed are clustered in particular levels of education, and thus whether there are labour demand and supply mismatches specific to each governorate.

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[9] It is also evidenced by Egypt's low and deteriorating rank in the "ratio of women to men in the labour force" in the World Economic Forum's Global Competitiveness Index (133 (/134 countries) in 2008/2009, dropping to 139 (/144) in 2012/2013 (WEF 2008-2009; 2012-2013)).

Figure 9. The Unemployed by Governorate and Distributed by Level of Education, 2011
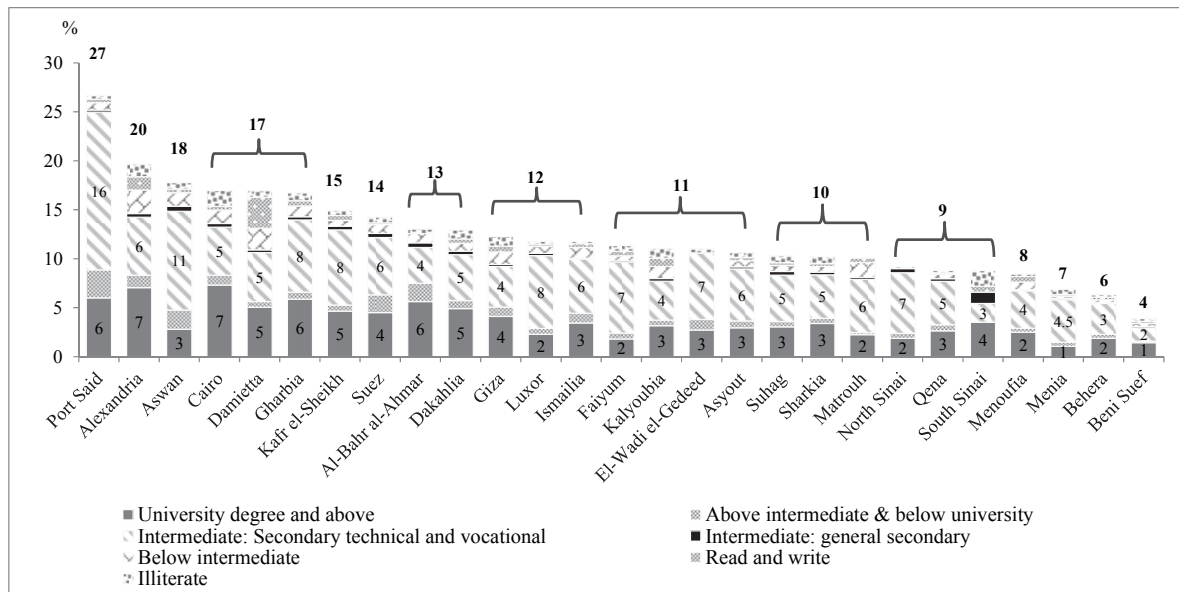
Source: Authors' calculations based on CAPMAS Annual Labour Force Survey – Population and Employment Statistics 2011.

Note: Percentage shown for intermediate reflects total intermediate (both general secondary and secondary technical and vocational).

Comparing the **percentage of the unemployed in each governorate by level of education** with the nation-wide averages shown in Figure 2, we note that there is a similar dominance of holders of intermediate (encompassing 'general secondary' and 'technical and vocational secondary') and of 'university and post university' levels of education among the unemployed. We single out the following governorates with a problem in intermediate-level education: Port Said, Aswan, Gharbia, Kafr el-Sheikh, Luxor, Ismailia, Faiyum, El-Wadi el-Gedid, Asyout, Suhag, Sharkia, Matrouh, North Sina, Qena, Menoufia, Menia, Behera and Beni Suef. Governorates with a problem among 'university or above' are: Alexandria, Cairo, Gharbia, Kafr el-Sheikh, Red Sea, Dakahlia, Giza, Qena, South Sinai and Behera.

Table 1 summarizes the above findings, reflecting the problems identified in each governorate as well as the national incidence of these problems.

Table 1. Governorates' Shares in Egypt's Labour Force, Unemployment Problems Related to Age, Gender and Level of Education, 2011.

Unemployment Problem				Age	Gender		Education		Incidence of problems by governorate
				Youth	Male	Female	University and above	Intermediate (secondary general; secondary technical and vocational)	
Shares of governorates in Egypt's labour force	Above average (80% in total)	Greater Cairo	Cairo		×		×		**2**
			Giza		×				**1**
			Kalyoubia		×				**1**
		Delta	Behera	×			×	×	**3**
			Sharkia	×	×			×	**3**
			Gharbia		×	×	×		**3**
			Dakahlia			×	×		**2**
			Menoufia					×	**1**
		Upper Egypt	Suhag	×	×			×	**3**
			Menia			×		×	**2**
			Asyout	×				×	**2**
			Faiyum	×		×		×	**2**
		Coastal	Alexandria		×	×	×		**3**
	Average (7.5 percent in total)	Delta	Kafr el-Sheikh			×	×	×	**3**
		Upper Egypt	Beni Suef	×				×	**2**
	Below average (12.5 percent in total)	Delta	Damietta		×				**1**
		Upper Egypt	Aswan	×	×	×		×	**4**
			Qena	×			×	×	**3**
			Luxor					×	**1**
		Canal	Port Said		×	×*		×	**3**
			Ismailia	×				×	**2**
			Suez	×	×				**2**
		Border	North Sinai	×		×		×	**3**
			Red Sea	×		×	×		**3**
			Matrouh	×				×	**2**
			El-Wadi el-Gidid			×*		×	**2**
			South Sinai				×		**1**
National incidence of the problem				**13**	**11**	**11**	**9**	**17**	

Source: Compiled by the authors with calculations based on CAPMAS Annual Labour Force Survey – Population and Employment Statistics 2011.

Notes: × Denotes the existence of an unemployment problem (higher than the nation-wide average). * The female labour force participation rate is higher than the nation-wide average, but female unemployment is also high, signaling pronounced misuse of latent female labour force.

- *At the national level, the highest incidence of problems* is among the holders of intermediate education, followed by youth, gender (on a par between males and females), and finally 'university and above'.

- *By governorate,* with special reference to those with above-average share in Egypt's labour force, *the highest number of problems* were found in: Behera, Sharkia, Gharbia, Suhag and Alexandria, followed by Cairo, Dakahlia, Menia, Asyout and Faiyum.

II. SOURCES OF THE PROBLEM

In this section, we explore some of the reasons for the disparities in unemployment among governorates. These reasons include: the type of activities dominating the governorate's economic scene (with emphasis on industry and the historical trend of investments made in manufacturing); the energy subsidies and how they may have fuelled the growth of particular manufacturing industries; the magnitude and type of public investments in infrastructure (together with their regional distribution); the misalignment between holders of technical and vocational degrees by governorate; access to loans as hindrance to investment in general.

III.i. Capital Intensity of the Dominant Activities by Governorate

In the present exercise, we look at whether the structure of economic activity by governorate fosters employment generation. Ideally, this exercise would require data for each governorate's output broken down by the three major economic activities (agriculture, industry (mining and quarrying, and manufacturing), and services). However, no such data are available for Egypt. In fact, CAPMAS only issues aggregate activity output data at the national level without distinguishing activity output by geographical region.[10] Instead, we used the activity share in governorate employment so as to determine its dominant activity (see Figure 10).

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[10] In fact, the Ministry of Planning is presently coordinating with CAPMAS on the issuance of output data by activity and by governorate. Such data will help shed much light and push forward much-needed analysis on productivity by activity at the governorate level.

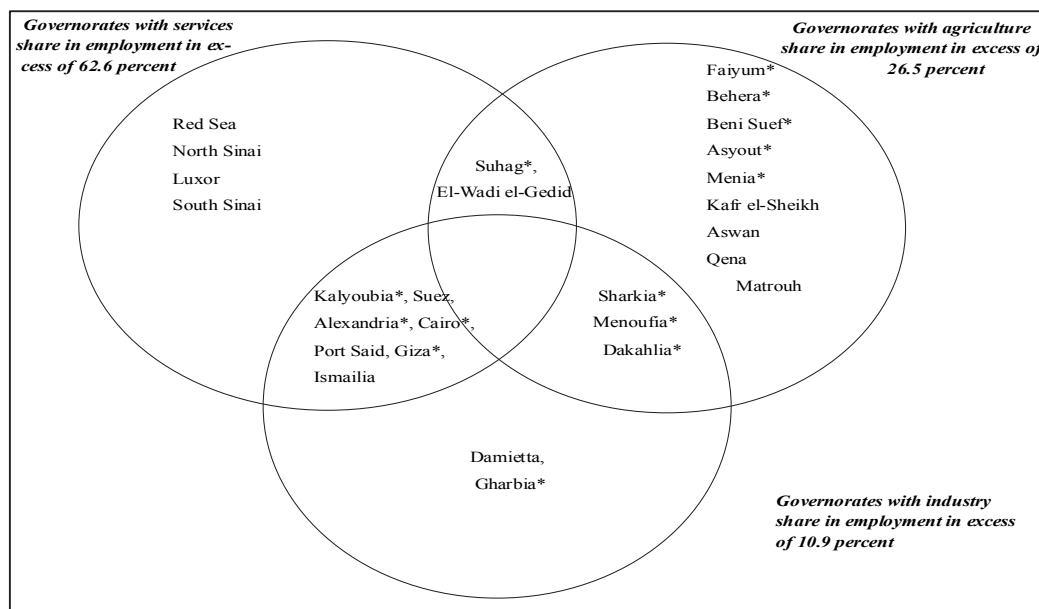**Figure 10. Share of Activities in Total Employment by Governorate, 2011**
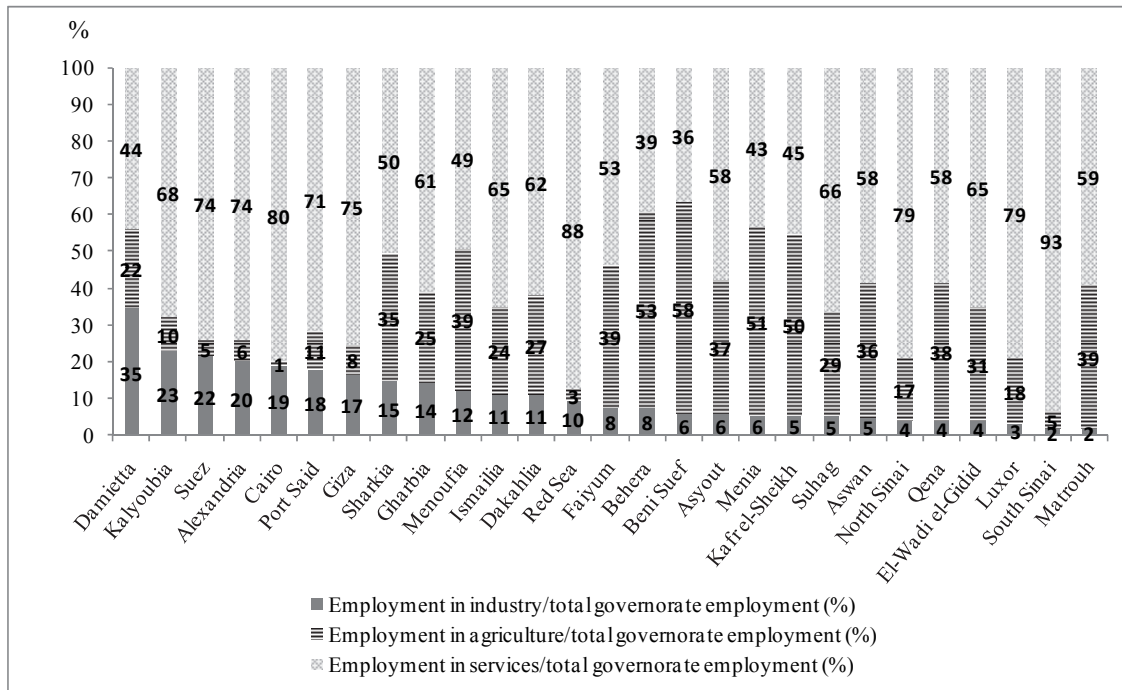
Source: Authors' calculations based on CAPMAS Statistical Yearbook 2012.

Note: We arranged governorates in descending share of industry share in employment so as to show the governorates where industrial activity is most dominant (to match the subsequent analysis).

Based on data in Figure 10, we found the average governorate industry share in employment to be 10.9 percent, while agriculture and services had shares of 26.5 and 62.6, respectively. We then identified governorates where the share of either one of the three activities in employment exceeded the nation-wide average. This paved the way for the grouping of governorates by dominant economic activity shown in Figure 11.

Figure 11. Governorates of Egypt Classified as per Share of Activities in Total Employment

Governorates with services share in employment in excess of 62.6 percent

Governorates with agriculture share in employment in excess of 26.5 percent

Red Sea
North Sinai
Luxor
South Sinai

Suhag*,
El-Wadi el-Gedid

Faiyum*
Behera*
Beni Suef*
Asyout*
Menia*
Kafr el-Sheikh
Aswan
Qena
Matrouh

Kalyoubia*, Suez,
Alexandria*, Cairo*,
Port Said, Giza*,
Ismailia

Sharkia*
Menoufia*
Dakahlia*

Damietta,
Gharbia*

Governorates with industry share in employment in excess of 10.9 percent

Source: Compiled by the authors based on research findings.

Notes: Governorates have been arranged in descending order with respect to the share of industry in governorate employment (as per Figure 11). * denotes governorates whose share in Egypt's labour force exceeds the average share.

Our next step would have been to examine the capital intensity of each governorate's dominant activities to determine their capacity for employment generation. Except for industry, there are no data available for capital by activity by governorate. We, therefore, limited our analysis to industry and relied on the CAPMAS Annual Industrial Survey capital data by industry by governorate.

Against the rationale that mining and quarrying are more capital intensive than manufacturing,[11] we began by distinguishing between those governorates in which 50 percent or more of industrial output was generated by manufacturing, and vice versa. Results are shown in Table 2.

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[11] Also proven by other studies, see for example Eurostat (2012).

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Table 2. Classification of Governorates by Mining/Quarrying and Manufacturing Share in Industrial Output, 2011

Governorates with 50 percent or more manufacturing share in industrial output	**Cairo, Alexandria, Ismailia, Suez, Damietta, Kalyoubia, Giza, Sharkia, Gharbia, Menoufia, Behera, Beni Suef, Menia, Asyout, Suhag, Qena, Aswan, Luxor**
	Among these governorates:
	Average manufacturing share (%) 97
	Maximum manufacturing share (%) 100
	Minimum manufacturing share (%) 71.8
	Standard deviation 0.083
Governorates with 50 percent or more mining/quarrying-share in industrial output	**Port Said, Red Sea, El-Wadi el-Gedid, Matrouh, North Sinai, South Sinai, Dakahlia, Kafr el-Sheikh, Faiyum**
	Among these governorates:
	Average mining/quarrying share (%) 87
	Maximum mining/quarrying share (%) 100
	Minimum mining/quarrying share (%) 63.5
	Standard deviation 0.135

Source: Calculated from CAPMAS Annual Industrial Survey, 2010-2011 and 2011.

III.i.a. Outlook for Governorates in which Industrial Output is Dominated by Manufacturing

Building on Table 2, we identified the activities that together account for 90 percent or more of the governorate's manufacturing output, calculated the capital intensity of each activity[12] and their average. It is worth noting that there is no standard international classification of activities by capital intensity. However, OECD and Eurostat classify activities by type of technology, as follows: low technology, medium-low, medium-high, and high. Although there is no immediate parallel between capital intensity and type of technology, empirical studies measuring capital intensity of manufacturing industries tend to associate the higher capital intensity with higher level technologies[13] (see, for example, Ebeling (2004); Arrow et al. (1961)). We assess the degree of dominance of capital intensive activities by summing up the shares of medium-low activities and above.

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[12] For capital intensity, we calculated the ratio of real capital:labour (K:L) in each activity, where real capital is the value of nominal net fixed assets at end of year deflated using each manufacturing and mining/quarrying activities producer price index (issued by CAPMAS). Fixed assets are equal to the stock of fixed assets at the beginning of the year, plus fixed capital formation, less sold or ruined assets, less depreciation.

[13] Except, perhaps, for coke and refined petroleum, basic metals which are assessed to be of highest capital intensity (Arrow et al. 1961, 240), but are classified as medium-low technology.

Ranking governorates by capital intensity (see Appendix I for details of governorate structure of manufacturing and average capital intensity), we take four examples of governorates straddling Egypt. Each of these governorates has above-average share in Egypt's labour force and possessing at least two of the employment problems analyzed in this paper: Cairo (Greater Cairo), Sharkia (Delta), Asyout (Upper Egypt) and Alexandria (Coastal Region). In reference to Appendix I, these governorates' manufacturing activities were found to be dominated by medium-low, medium-high and high technology activities of the following magnitude: 73 percent in Cairo, 53 percent in Sharkia, 89 percent in Asyout, and 85 percent in Alexandria. Their manufacturing does not reflect a high employment generation capacity. Moreover, many of these capital intensive activities are also energy intensive (denoted by an asterisk).

III.i.b. Investment Patterns - Fuelling the Growth of Capital Intensive Manufacturing Activities

We further probed whether the leading activities analyzed above have a capacity for employment generation *at the national level*, meanwhile drawing on the findings of Abou-Taleb et al. (2013) who studied the shares of each manufacturing activity in total investment in manufacturing at the national level over the period 1982/1983 – 2010/2011. Our objective was to weigh out the employment generation prospects of these activities against how much investment they enjoyed over a thirty-year time stretch. Results are shown in Table 3.

Table 3. Shares of Leading Manufacturing Activities (Classified by Type of Technology) in Manufacturing Employment and in Manufacturing Investment, 2011 and 1982/1983 – 2010/2011.

Type of technology:	Low	Medium-low	Medium-high	High
Activity	Food*, beverages, tobacco, textiles, apparel, wooden products and furniture, paper products	Coke and refined petroleum*; rubber and plastics; non-metallic mineral products*; basic metals*; machinery and equipment; other manufacturing	Chemicals*, electrical equipment, motor vehicles	Pharmaceuticals
Collective share in total manufacturing employment in 2011 (%)	50.1	**25.4**	**12.1**	**4.0**
Collective share in total manufacturing investment, average for the period 1982/1983 – 2010/2011 (%)	27.9	**55.1**	**13.8**	**3.2**

Sources: Calculated from CAPMAS Annual Industrial Survey 2009/2010 and 2010, and Abou-Taleb et al. 2013:14 (Table 1).

Table 3 clearly points to the fact that what we detected at the regional level is a reflection of the national level. Although the *medium-low*, *medium-high,* and *high technology* manufacturing activities have received 72 percent of manufacturing investment, their employment generation was not on a par—they generated 41.5 percent of total manufacturing employment in 2011. This stands in contrast to activities of lower capital intensity that received 27.9 percent of investment, on average, while generating 50 percent employment. Thus, investment norms appear to have favoured more capital intensive activities whose prospects for employment generation are, by definition, lower.

III.i.c. Energy Subsidies - Fuelling the Growth of Capital/Energy Intensive Manufacturing Activities.

Appendix I and Table 3 show that many of the leading activities in the governorates are not only capital intensive but are also energy intensive (denoted by an asterisk). Egypt's long record of energy subsidies is among the sources of such capital/energy intensity in many governorates. For perspective, between 2005/2006[14] and 2012/2013, energy subsidies have constituted around 20 percent of government expenditure, and 6 percent of GDP (calculated from Ministry of Finance, the Financial Monthly, various issues).

III.i.d. Outlook for Governorates in which Industrial Output is Dominated by Mining/Quarrying

In line with the above analysis, we looked at the industrial structure for mining/quarrying-dominated governorates. We thus assessed not only the share of mining/quarrying in the governorate's total industrial output, but also its manufacturing share. We further qualified the average capital intensity for the manufacturing component of industrial output, meanwhile shedding light on the manufacturing activities' classification according to technology, and also to energy-intensity. Results are presented in Appendix 2.

Like manufacturing-dominated governorates, those which are mining/quarrying-dominated also appear to lean heavily towards capital intensive activities, *first-and-foremost* due to the share of the mining/quarrying in industrial output, and *second* due to existence of *medium-low* to *medium-high technology* activities among their manufacturing. As shown in

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[14] 2005/2006 being the first year in which petroleum (oil and gas) subsidies were accounted for in the budget (*Source*: Vagliasindi 2012).

Appendix 2, at least one of the manufacturing activities is energy intensive, furthering our proposition that energy subsidies fuelled the growth of these activities.[15]

III.ii. Hindrances to Investment: Weak Investment in Infrastructure across the Country

Egypt has experienced a deteriorated rate of investment, and weak public investment in infrastructure across the country. For perspective, investment (public and private) as percent of GDP dropped from 20 percent in 2009/2010 to 14.4 percent in 2012/2013 (Ministry of Planning, Monthly Bulletin, various issues). Moreover, Egypt's public infrastructure investments/GDP is 3.6 percent (calculated based on data from the Ministry of Planning, Macroeconomic Indicators for the Egyptian Economy), which is low compared to the 8.8 percent MENA region average for the period 2000-2010 (World Bank 2012, 54).

With reference to investment in infrastructure, we note that "an inadequate supply of infrastructure" has been cited among the most problematic factors for doing business in Egypt over the period 2009-2010 through 2013-2014 (World Economic Forum, *Global Competitiveness Report*, various issues). Over the same period, Egypt's rank deteriorated in all dimensions of the 'infrastructure pillar' in the Global Competitiveness Index (as shown in Table 4), particularly on the "quality of overall infrastructure" which has consistently dropped in both absolute and relative ranks between 2009 and 2013 (with relative rank slipping into the lowest quintile in 2013-2014):

Table 4**. Egypt's Ranking in Dimensions of the Infrastructure Pillar, 2009-2010 and 2013-2014.**

Years		2009-2010 (/133 GCR)	2010-2011 (/139 GCR)	2011-2012 (/142 GCR)	2012-2013 (/144 GCR)	2013-2014 (/148 GCR)
-Quality of overall infrastructure	Absolute rank	56	68	80	88	118
	Relative rank	0.42	0.49	0.56	0.61	0.80
-Quality of railroad infrastructure	Absolute rank	47	46	51	52	63
	Relative rank	0.35	0.33	0.36	0.36	0.43
-Quality of port infrastructure	Absolute rank	57	69	79	79	80
	Relative rank	0.43	0.50	0.56	0.55	0.54
-Quality of air transport infrastructure	Absolute rank	44	39	48	54	59
	Relative rank	0.33	0.28	0.34	0.38	0.40

Source: World Economic Forum, *Global Competitiveness Report* (GCR), various issues.

Among the underpinnings of the deteriorated infrastructure rank are: the magnitude of public investment in infrastructure and their distribution among various types of infrastructure, as well as also their distribution among regions.

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[15] Similar conclusions reached in World Bank (forthcoming).

Over the period 2002/2003-2012/2013, Egypt's average public investment[16] was 8.25 percent of GDP, of which 3.6 percent were allocated to infrastructure (calculated based on data from the Ministry of Planning (2014)). Infrastructure investments were distributed as follows: transportation[17] and storage (1.5 percent); electricity (1.3 percent); water and sanitation (0.5 percent); communication and information technology (0.3 percent); and Suez Canal (0.1 percent) (calculated from the Ministry of Planning data (2014)). Figure 12 shows the yearly distribution of public infrastructure investments—again with the clear dominance of transportation and storage, and electricity over other infrastructure sectors.[18]

Figure 12. Infrastructure Investments Share in GDP Broken Down by Infrastructure Sector, 2002-2013
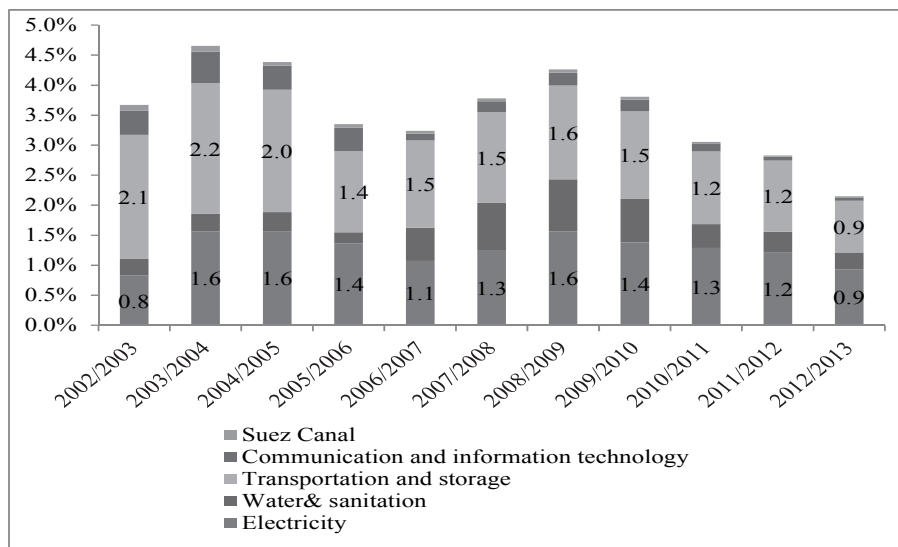
Source: Calculated based on the Ministry of Planning data.

Zooming in specifically on investments in 'transportation and storage', and 'electricity' infrastructure, we find that despite increased government claims to fill infrastructure gaps in Upper Egypt and other regions, Egypt's 2013/2014 Plan for Economic and Social Development has not been sufficiently oriented to Upper Egypt, the Delta, the Border, and Canal regions, and has clearly favoured Greater Cairo and Alexandria.

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[16] Public investment includes investments in economic sectors (agriculture, industry and various services), as well as in infrastructure (of which are electricity, transportation and storage, communications and Suez Canal).

[17] Of which are physical infrastructure like roads, bridges, railway systems, tunnels, etc.

[18] For further discussion of infrastructure and growth in Egypt, see Loayza and Odawara (2010).

Table 5. The Distribution of Investments in Transportation and Storage, and Electricity and Other Public Utilities, by Geographical Region in Egypt's 2013/2014 Plan for Economic and Social Development

Region Investment by Infrastructure type	Greater Cairo	Coastal (Alexandria)	Upper Egypt	Delta	Border	Canal	Total
Transportation and storage by region as percent of total transportation investments	58.0	4.8	8.10	12.0	7.9	9.2	100
Electricity and other public utilities	47.1	11.3	16.6	14.8	7.4	2.8	100

Source: Calculated from the Ministry of Planning's 2013/2014 Plan for the Economic and Social Development of Egypt.

As evident from Table 5, the plan allocated 62.8 percent of total transportation and storage infrastructure investment to Greater Cairo and Alexandria, and 58.4 percent of electricity investment to the two regions.

However, Egypt's first stimulus package (launched in 2013) appears to have attended to some of the regional disparities that were more pronounced in the government's 2013-2014 Plan. Overall infrastructure[19] investments show that Greater Cairo continues to have the lion's share of investments (46 percent), with Alexandria having a share of 2.5 percent. Meanwhile, positive attention appears to have been directed to the Delta and Border regions (allocated 16.5 and 20 percent, respectively), with Upper Egypt and the Canal regions getting 12 percent and 3 percent, respectively (calculated from the Ministry of Finance and Ministry of Planning, Stimulus Package data).

III.iv. Hindrances to Investment: Access to Loans

In general, obtaining credit remains a key hindrance to investment and company growth in Egypt. Out of 144 countries included in the GCR in 2013-2014, Egypt ranked 100 in the ease of access to loans. This problem is particularly more pronounced for small and medium-sized firms. While 75 percent of these firms presented applications for bank loans in 2010, 92 percent of these requests were denied. As such, loans to small and medium enterprises constitute a mere 6 percent of the total banking sector credit, which is much lower compared to a 20 percent OECD countries' average (Saleh 2013).

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[19] Including roads and bridges, electricity, water and sanitation.

III.v. Supply-Demand Mismatch with Special Reference to Holders of Intermediate Education

In reference to the problem of high unemployment among holders of intermediate education (specifically, holders of technical and vocational degrees), we looked at the correlation between the share of those obtaining a specific type of technical or vocational education (namely, agricultural, industrial and commercial) in total technical and vocational degree holders by governorate, and the share of the relevant economic activity (agriculture, industry, and services) in total employment by governorate. Results are shown in Table 6 below.

Table 6. Correlation of the Share of Activity in Total Employment by Governorate with Share of Holders of Industry/Agriculture/Service-Specific Technical and Vocational Degrees in Total Holders of Technical and Vocational Degree Holders by Governorate, 2011

Share of:	Agriculture in total employment by governorate	Industry in total employment by governorate	Services in total employment by governorate
Holders of technical and vocational degrees in *agriculture* in total technical and vocational education degree holders	0.59 Significant at α=0.05		
Holder of technical and vocational degrees in *industry* in total technical and vocational education degree holders		0.164 Insignificant at α=0.10	
Holders of technical and vocational degrees in commerce in total technical and vocational education degree holders			0.052 Insignificant at α=0.10

Source: Calculated based on Ministry of Education (2011/2012).

A strong positive correlation exists between governorate employment in agriculture and the share of holders of 'agricultural technical/vocational degree' in total holders of technical/vocational degrees, perhaps pointing to synergy between the latter group's skills and those demanded in the sector. Such synergy is less apparent in the cases of services and industry where not only is the correlation weak (albeit positive), but it is also statistically insignificant perhaps pointing to misalignment between the skills required by industry and service activities, and those offered at the governorate level. Indeed, international experience points to such misalignment and the need to better align the supply of training and the demand for skills (for OECD and EU experiences, see Keating (2007), and for the Kenyan experience see Nyerere (2009)).

VI. WHAT MAY BE DONE: CROSS-CUTTING AND GOVERNORATE-SPECIFIC SOLUTIONS

Some of the solutions we propose to the problems identified in Section III are cross-cutting, while others are governorate-specific.

VI.i. *Cross-Cutting Solutions:*

- *Implementing Article 32 of the 2013 Constitution stipulating that corporate taxes must ensure the promotion of labour-intensive activities for their potential to stimulate economic development.* One option would be to give tax incentives or to provide credit guarantees to viable enterprises engaged in labour-intensive activities.

- *Implementing an investment-promotion policy that seeks to facilitate access to loans, especially for small and medium enterprises.* At present, the banking sector has a low loan:deposit ratio of 42 percent (CBE Monthly Statistical Bulletin, May 2014) pointing to its inadequate intermediation role. With the government paying 16 percent interest rate on its short term domestic debt, the banking sector continues to shoulder Egypt's budget deficit. In essence, the government is absorbing liquidity from the domestic financial sector and crowding out private sector borrowing, discouraging investment and employment.

  Investment is also discouraged by the high rate of rejection of loan requests, especially those made by small and medium enterprises (alluded to in Section III) that cannot use real estate as collateral for obtaining the loan. Although there is no official legislation that stands against the granting of loans against real estate collateral, there are very few banks that use such collateral to grant loans primarily because this involves cumbersome procedures. Another hindrance in this regard is that real estate collateral requires that assets be officially registered, which is not always the case.

- The Egyptian government is phasing out energy subsidies which may help promote the growth of labour intensive activities. In addition to the gradual subsidy cuts, the government must also ensure that targeted social assistance (including targeted cash transfers and vouchers) is in place so as to mitigate the negative implications for poor households.

- *Implementing Article 20 of the 2013 Constitution stipulating that the State is obliged to promote all types of technical and vocational training, and that this must be in keeping with the labour market requirements.* We have shown in this study that although there appears to be synergy between governorate employment in agriculture (skill needs), and the share of

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holders of 'agricultural technical/vocational degree' in total holders of technical/vocational degrees (supply of skills), such synergy is less apparent in the cases of services and industry. The governorate's skill needs (dictated by its leading activities) must be tuned to their supply (output of the vocational/technical education). This may be part of the Egypt's current decentralization efforts.

- *Implementing Articles 176 to 183 of the 2013 Constitution stipulating that local governments will be fiscally and administratively autonomous.* Being closer to their problems, and also closer to knowledge of their endowments of human or physical capital, governorates can identify the activities to which they wish to attract investments to (either to expand or to initiate de novo) in order to address specific problems (along the lines of the suggestions we give in Table 7 below).

- Raising public infrastructure investments from its present low level of 3.6 percent of GDP (compared to the 8.8 percent MENA region average for the period 2000-2010). Increasing expenditure must be coupled with raising funds allocated to remote areas. If the present government begins to implement President Sisi's plan for administrative decentralization through redrawing the boundaries of various governorates, it will be imperative that infrastructure investment (especially in transportation) be made in the South, the Canal Region, and the West of Egypt. We note further that Egypt is embarking on several mega projects with great potential for infrastructure investment and employment generation, many of these projects can be implemented through public private partnerships (whether domestic or foreign). Following are some of these projects and the governorates expected to benefit thereof: *East Port Said Port (Port Said); New Urban City of Port Said (Port Said); Industrial Zone Eastern Port-Said Area (Port Said); Suez Canal-Ismailia Tunnel (Canal governorates); North-West Gulf of Suez (Suez); Land Reclamation of 60 acres of agricultural land in Sahl El-Tena Region (Suez); New City of Ismailia (Ismailia); Technology Valley (Ismailia); Upper Egypt-Red Sea Road (Sohag and Red Sea);* three dry ports in the governorates *Asyout*, *Suhag*, east of *Red Sea*, *Qena*; Abu Zneima Industrial Park (*South Sinai*); Alamein City (*Matrouh*), mining and quarrying of minerals in the Golden Triangle "Qena-Safaga-El-Kosair" (*Qena and Red Sea*); developing Safaga port (*Red Sea*).

IV.ii. Governorate-Specific Solutions

Our suggestion of governorate-specific solutions is limited to those governorates that together constitute 80 percent of Egypt's labour force, in the hope that this might contribute to solve a large portion of Egypt's employment problem. In Table 7, we symbolically identify those industrial activities that may be expanded in order to absorb specific categories of the unemployed in the governorate (gender- or education-wise), or to build on some of the mining/quarrying potentials of the governorates (if they have such endowments).

Table 7. Industries Targeted for Promotion in order to Mitigate Unemployment in Governorates Constituting 80 percent of Egypt's Labour Force

Target Governorate	To promote industries of:	To mitigate unemployment of:
Cairo	[pharmaceuticals] [food] [beverages] [LEATHER] The government is in the process of moving the leather tanning businesses to the leather cluster of El-Robeiky in the city of Badr, Cairo.	[man] [woman] [graduate] [tools] [man] [tools]
Giza	[food] [pharmaceuticals] [art/painting] [car]	[woman] [graduate] [tools] [graduate] [tools]
Kalyoubia	[food]	[woman] [graduate] [tools]
Behera	[food] [TEXTILE Industry] [beverages]	[graduate] [tools]
Sharkia	[food] [TEXTILE Industry] [clothing] [television]	[man] [woman] [graduate] [tools] [graduate] [tools]
Gharbia	[food] [TEXTILE Industry] [clothing]	[man] [woman] [graduate] [tools]
Dakahlia*	[food]	[woman]
Menoufia	[food] [TEXTILE Industry] [television] [MACHINERY & EQUIPMENT]	[woman] [graduate] [tools] [graduate] [tools]
Suhag	[food] [documents/paper] [furniture]	
	[food] [TEXTILE Industry]	[woman] [tools]
Menia	[furniture]	[tools]

	potential limestone, in addition to basalt and ornamental stones (which are, at present, only partially used)[20]	
Asyout	Food processing: especially, meat processing and dairy products Horticulture: sunflower with industrial processing to yield sunflower oil; also, drying onions from the widely planted onion patches; drying and packaging of fruits	
Faiyum*		
Alexandria	TEXTILE Industry extraction with further processing through fluoridating, iodizing, or generating compounds for further medical use	

Source: Compiled by the authors.

Notes: * Governorates whose industry is mining/quarrying dominated.

Key to the icons used: food products; beverages; tobacco; automobiles; pharmaceuticals; electrical equipment; textiles; wearing apparel; quarrying activities; crude petroleum extraction and mining of metal ores; leather and tanning; salt extraction; agro-industrial products (fruits, vegetables and oils); wooden products and furniture; machinery and equipment not elsewhere classified; paper and paper products.

Using a much-needed spatial approach, we have attempted in this study to zoom in on unemployment in each of Egypt's twenty seven governorates, meanwhile identifying the age-, gender-, and education-related sides of the problem. With emphasis on industry, our analysis has pinpointed one of the reasons why governorates have not been able to generate employment (at least to the desired levels), namely, that their industrial structure is largely capital and energy intensive. This has been fuelled by two factors: investments geared to capital and energy intensive sectors, and a long record of energy subsidies. Another reason relates to the mismatch of supply and demand for skills (as determined by the leading activities in each governorate). We propose some cross-cutting and governorate-specific solutions to help address unemployment. Cross-cutting solutions relate to the investment

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[20] For extensive coverage of mining and quarrying potentials in Egypt, see Center for Political and Strategic Studies 2012: 379-435.

climate, to intermediate education, and to investment in infrastructure, while governorate-specific ones relate to the promotion of specific industrial activities in order to mitigate specific unemployment problems. However, we stress that no research paper can give an exhaustive set of solutions. We have merely sought to give directions for policy-making at the governorate-level. In the spirit of decentralization, further research needs to be carried out in order to help governorates develop from the bottom up, building on their innate strengths, endowments, and geographic characteristics.

Appendix 1. Governorate Average Capital Intensity of Leading Manufacturing Activities (Classified by Type of Technology), 2011

Governorate	Dominant manufacturing activities average capital intensity (LE)	Share of leading manufacturing activities in governorate manufacturing output (%) (classified by type of technology)		Share by type of technology (%)
Suez	421,252	*Low*	Food products* (4); Textiles (1)	5
		Medium-low	Coke and refined petroleum products* (44); Other non-metallic mineral products* (19); Basic metals* (16)	79
		Medium-high	Chemicals and chemical products* (16)	16
Qena	363,088	*Low*	Food products* (33);	33
		Medium-low	Basic metals* (53); Other non-metallic mineral products* (14)	67
Beni Suef	276,583	*Low*	Food products* (22);	22
		Medium-low	Other non-metallic mineral products* (54); Rubber and plastics (23)	77
Damietta	269,767	*Low*	Food products* (15); Textiles (7); Wood and products of wood and cork except furniture, and furniture (5)	27
		Medium-low	Rubber and plastics products (11); Other non-metallic mineral products* (2)	13
		Medium-high	Chemicals and chemical products* (60)	60
Asyout	254,250	*Low*	Food products* (8) ; Tobacco (2)	10
		Medium-low	Coke and refined petroleum products* (61); Other non-metallic mineral products (28)	89

Governorate	Number	Category	Industries	%
Aswan	**226,720**	*Low*	Food products* (69); Paper and paper products (8); Wood and products of wood and cork except furniture (2)	79
		Medium-low	Basic metals* (10);	10
		Medium-high	Chemicals and chemical products* (10)	11
Alexandria	**141,457**	*Low*	Food products*(6.5); Textiles (2); Apparel (1.5)	10
		Medium-low	Coke and refined petroleum products* (58); Basic metals* (10); Non-metallic mineral products (4); Rubber and plastics products (3)	75
		Medium-high	Chemicals and chemical products* (10)	10
Menoufia	**110,714**	*Low*	Food products (16); Textiles (5.5); Paper and paper products (1.5)	23
		Medium-low	Basic metals (47); Machinery and equipment not elsewhere classified (4); Other non-metallic mineral products (4); Rubber and plastics (1);	54.5
		Medium-high	Electrical equipment (13); Chemicals and chemical products (1.5)	14.5
		High	Basic pharmaceutical products and pharmaceutical preparations (2)	2

Cairo	92,284	*Low*	Food products* (15); Beverages (8)	23
		Medium-low	Coke and refined petroleum products* (30); Basic metals* (9); Other non-metallic mineral products* (5); fabricated metal products except machinery (3); Machinery and equipment (2.5); Rubber and plastic (2)	51.5
		Medium-high	Electrical equipment (5); Motor vehicles (4); Chemicals and chemical products* (2)	11
		High	Basic pharmaceutical products and pharmaceutical preparations (11)	11
Sharkia	80,289	*Low*	Food products* (20); Textiles (16); Paper and paper products (4); Apparel (2.5);	42.5
		Medium-low	Basic metals* (6); Other non-metallic mineral products* (5); Rubber and plastics (3); Machinery and equipment (2.5); Fabricated metal products except machinery (2)	18.5
		Medium-high	Electrical equipment (26); Chemicals and chemical products* (3)	29
		High	Basic pharmaceutical products and pharmaceutical preparations (5.5)	5.5

Kalyoubia	76,984	*Low*	Food products* (13); Other manufacturing (of which are: jewelry, and medical/dental equipment) (7); Beverages (3); Textiles (2.5); Paper and paper products (2.5); Apparel (2)	30
		Medium-low	Coke and refined petroleum products* (27); Basic metals* (10); Other non-metallic mineral products* (9); Machinery and equipment not elsewhere classified (5); Rubber and plastics products (3)	54
		Medium-high	Chemicals and chemical products* (5);	5
		High	Basic pharmaceutical products and pharmaceutical preparations (4);	4
Menia	70,581	*Low*	Food products* (90); Textiles (2); Wooden furniture (0.5)	92.5
		Medium-low	Other non-metallic mineral products*(0.5);	0.5
		Medium-high	Chemicals and chemical products (7);	7
Behera	60,333	*Low*	Food products* (70); Textiles (17); Beverages (3)	90
		Medium-low	Other non-metallic mineral products* (6)	6
		Medium-high	Chemicals and chemical products (3)	3

Giza	*Low*	Food products* (32); Tobacco (28); Beverages (2); Printing and reproduction of recorded media (3)	65
59,116	*Medium-low*	Other non-metallic mineral products* (5); Basic metals* (3); Machinery and equipment not elsewhere classified (3)	11
	Medium-high	Motor vehicles, trailers and semi-trailers (8); Chemicals and chemical products* (2)	10
	High	Basic pharmaceutical products and pharmaceutical preparations (8)	8
Luxor 52,720	*Low*	Food products* (100)	100
Gharbia	*Low*	Textiles (36); Food products* (12)	48
39,750	*Medium-low*	Coke and refined petroleum products* (33); Other non-metallic mineral products (2); Rubber and plastics (2)	37
	Medium-high	Chemicals and chemical products (9)	9
Ismailia	*Low*	Food products* (44); Apparel (33)	77
26,880	*Medium-low*	Other transport (shipbuilding) (13); Rubber and plastics (1.5)	14.5
	Medium-high	Computers, electronic and optical products (4); Chemicals and chemical products (1.5)	5.5

Suhag	24,033		Food products* (87.5);	
		Low	Paper and paper products (2);	
			Wooden furniture (1);	
			Textiles (1)	91.5
		Medium-low	Rubber and plastics (4)	8.5

Sources: Authors' calculations based on data from CAPMAS Annual Industrial Survey 2009/2010 and 2010; Eurostat Glossary: High Tech Classification of Manufacturing Industries http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=Glossary:High-tech_classification_of_manufacturing_industries&printable=yes, and U.S. Energy Information Administration "Annual Energy Outlook 2012" http://www.eia.gov/forecasts/aeo/pdf/0383(2012).pdf.

Notes: As indicated earlier, we look at activities with a 90 percent share of manufacturing output. For some governorates, we cover the full 100 percent, for others not the full 100 percent because there may be many minute industries that are difficult to add up to a complete share amounting to the full 100 percent.

- Technology classification as per OECD and Eurostat.

- ISIC Codes (Revision 4, 2-digit level): 10 (food products); 11 (beverages); 12 (tobacco products); 13 (textiles); 14 (wearing apparel); 15 (leather and related products); 16 (wood and products of wood and cork except furniture); 17 (paper and paper products); 19 (coke and refined petroleum products); 20 (chemicals and chemicals products); 21 (basic pharmaceutical products and pharmaceutical preparations); 22 (rubber and plastics product); 23 (other non-metallic mineral products); 24 (basic metals); 27 (electrical equipment); 28 (machinery and equipment not elsewhere classified); 29 (motor vehicles, trailers and semi-trailers); 31 (furniture) and 32 (other manufacturing).

* Denotes activities which are energy-intensive as per the U.S. Energy Information Administration.

Appendix 2. Governorate Average Capital Intensity of Leading Industrial Activities (Classified by Type of Technology), 2011

Governorate	Average industrial capital intensity (LE)	Share of mining and quarrying, and of manufacturing, in industrial output (%) (classified by type of technology)	
Port Said	1,972,578	*Mining and quarrying*	Extraction of natural gas (74)
		Low	Apparel (10)
		Medium-low	Basic metals* (5)
		Medium-high	Chemicals and chemical products* (6)
South Sinai	1,790,094	*Mining and quarrying*	Extraction of crude petroleum and natural gas (*99.5*); Quarrying of stones, sand and clay (0.05)
North Sinai	815,498	*Mining and quarrying*	Extraction of crude petroleum and natural gas (*88*); Quarrying of stones, sand and clay (2)
		Low	Food products* (1)
		Medium-low	Other non-metallic mineral products* (9)
Kafr el-Sheikh	660,495	*Mining and quarrying*	Extraction of natural gas (76)
		Low	Food products* (22); Textiles (0.4)
		Medium-low	Other non-metallic mineral products* (0.6)
Matrouh	574,338	*Mining and quarrying*	Extraction of crude petroleum and natural gas (*99.92*)
		Low	Food products (0.02)*; Beverages (0.06)
Faiyum	107,538	*Mining and quarrying*	Extraction of crude petroleum and natural gas (*93*); Quarrying of stones, sand and clay (2)
		Low	Food products* (3)
		Medium-low	Other non-metallic mineral products* (1)

	Mining and quarrying Extraction of natural gas (64)
Dakahlia 95,742	*Low* Food products (23)*
	Medium-low Other non-metallic mineral products (2)*
	Medium-high Chemicals and chemical products* (10)

Sources: Authors' calculations based on data from CAPMAS Annual Industrial Survey 2009/2010 and 2010; Eurostat Glossary: High Tech Classification of Manufacturing Industries http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=Glossary:High-tech_classification_of_manufacturing_industries&printable=yes, and U.S. Energy Information Administration "Annual Energy Outlook 2012" http://www.eia.gov/forecasts/aeo/pdf/0383(2012).pdf.

Notes : ISIC Codes (Revision 4, 2-digit level): 05 (mining of coal and lignite); 06 (extraction of crude petroleum and natural gas); 07 (mining of metal ores (ferrous and non-ferrous metals)); 08 (other mining and quarrying (of which the mining of chemicals and fertilizer minerals)).

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