

# Modeling the Socio-Economic Impact of Potential IFC Investments in Tunisia

– An Assessment of Employment and Value Added –



Final Report  
November 2012

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**steward redqueen**

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## Executive summary

In pursuing its goal of social and economic development by investing in the private sector, the International Finance Corporation (IFC) seeks to understand how it can most effectively contribute to economic development, job creation and poverty reduction in Tunisia. This study's objective is to provide a *pro forma* assessment of the effects of potential IFC investments in Tunisia in terms of employment generation and value-added creation. The IFC seeks to gain insights into its portfolio decisions by examining in greater depth the transmission belt between its investments on the one hand and broad economic outcomes on the other. The method employed for this hypothetical<sup>1</sup> exercise is formal input-output modeling. Specifically, the study examines the wider employment and value added or ripple effects of investing \$1 million into various sectors of the economy. On the basis of this modeling approach, we find that<sup>2</sup>:

1. Certain tensions may arise between creating large numbers of jobs and the GDP contribution or value-added of each of those jobs. Investing into capital abundant companies and sectors is likely to lead to relatively few additional jobs in the short term, but those investments may have the greatest potential to bring about long-term "transformational" effects like increases in labor productivity which are the source of higher incomes. Investing into agriculture supports<sup>3</sup> the largest quantity of employment, at least over the short-run, but given the low value added per job these investments are not likely to contribute to long-term economic development;
2. Given Tunisia's level of development it is crucial to raise the value added per job supported. Investing into more capital intensive sectors like mining, business services and utilities has the potential to increase labor productivity and to generate development effects for the economy as a whole.
3. Pursuing the goal of strengthening local value chains, the food processing sector is worth considering as it has the highest potential for backward linkages. In this sector roughly 35% of total value added arises directly, with the remaining part being captured by suppliers. For Tunisia we further find that food processing yields the highest value added impact compared to investing the same amount into other sectors. That is due to the capital scarce nature of the sector;
4. Analyzing the kind of value added associated with the investments shows that different parties benefit the most depending on the sector financed (in % of total value added):
  - Financing the public services sector and/or agriculture maximizes the wages earned by workers over the short run;
  - Financing manufacturing maximizes the amount of tax receipts of the Tunisian government;

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<sup>1</sup> Please refer to the methodology limitation's section for a feel for how theoretical the findings are

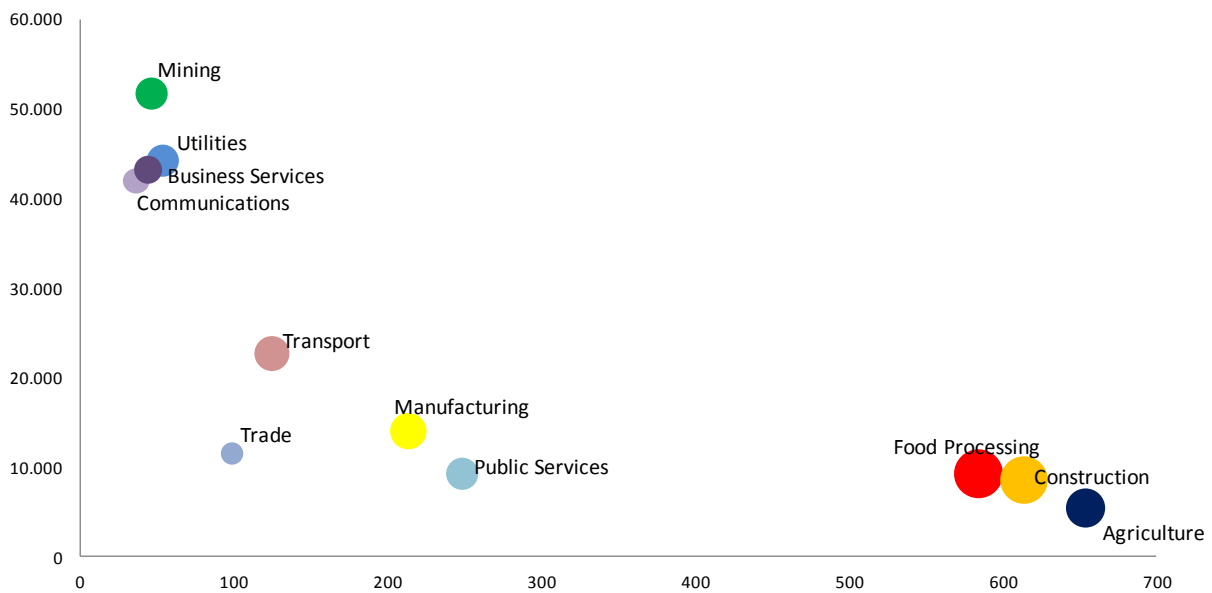
<sup>2</sup> The results presented in this report should be seen as directionally correct

<sup>3</sup> The term "supports" means that not all of the jobs or value added would necessarily vanish if IFC had not invested in its clients, since other lenders may have provided the same level of financing (approach does not take into account any financial additionality of IFC). Please also notice the difference between "creation" and "support"; "creation" indicates a net or incremental change and "support" refers to an associated economic impact at a given point of time

- Financing mining maximizes the profits earned by private sector companies.

5. In terms of a recommendation to IFC’s management, we believe it is crucial to recognize the various trade-offs that may exist when it comes to making investment decisions, e.g. between short-run and long-run impacts, or between employment generation and value-added creation. Therefore the IFC should consider shaping a portfolio of investments which helps to advance its overall objectives in Tunisia.

We emphasize that the underlying methodology used for this study, input-output modeling, enables us to quantify the wider socio-economic impacts of potential IFC investments into various sectors, but it also has its limitations. Financing provided to individual sectors has been translated into output using a Leontief or fixed production function assuming constant returns to input. This might not always be the case. In particular any “transformational” effects of IFC financing cannot be quantified this way. Also, the study works with sectors average productivity and spending patterns, not taking into account differences between firm sizes and the formal/informal sectors. Exhibit 1 summarizes the main findings.



**Exhibit 1:** Absolute amounts of employment (x-axis; real figures) and GDP contribution per job (y-axis; in \$) by sector were the bubble size indicates total associated value added (in \$ million)

## 1 Introduction, Objectives & Scope

Between June 2012 and August 2012, Professor Ethan B. Kapstein, along with René Kim and Hedda Eggeling of Steward Redqueen in the Netherlands, carried out a forward looking socio-economic impact assessment of investments in Tunisia. In pursuing the goals of job creation and poverty reduction, the IFC seeks to better understand how it can contribute to Tunisia’s social and economic development. There is consensus within the

development community that creating jobs is a key contribution of the private sector to global poverty reduction. In the developing world, where economic growth has remained relatively strong in recent years despite the global financial crisis that began in 2008, job creation has nonetheless lagged in many economies. Through demographic transitions related to high birth rates in such countries as Tunisia (and indeed throughout much of the Middle East and North Africa), more people are expected to enter the labor market in the near future. This will make the creation of employment one of the critical issues for Tunisia over the coming years.

Relatively little is known, however, about which interventions are most likely to contribute to job creation, nor about which activities are likely to provide most benefit to the poor. The objective of this study is therefore to shed light on the potential effects of IFC investments on the Tunisian economy. Further, the study aims to contribute to an understanding of how private sector operations more broadly can boost job creation in developing countries. Quantifying the impacts of investments in Tunisia can help management decision-making by:

1. *Anticipating* the ex-ante estimate of potential effects by providing insights into the scale of effects of various investments on the local economy designed to have bolstering (positive) impacts;
2. *Engaging* IFC's various stakeholders (including government agencies, non-government organizations, and private sector managers and employees), in discussions about how to improve IFC's economic impacts, based on a realistic interpretation of facts.

Whereas similar studies on Jordan and Ghana provide a more in-depth analysis of IFC's existing investments, this report primarily discusses the (hypothetical) impacts arising from financing various sectors in terms of employment creation and value added (defined as incomes, profits, and taxes). This is done at a macro-economic, theoretical level for sectors within the Tunisian economy. Worth mentioning is that, as this study doesn't look at the impact of investments IFC is already engaged in, but theoretically discusses the impact of future investments, no conclusions can be drawn on the size of the impact IFC is currently having in Tunisia. Whereas the general economic reasoning also applies to other countries, the extent of the impact (and multipliers) is Tunisia specific. In the end, we present some recommendations to IFC's management.

## 2 Tunisia's economy

Unlike many economies in the Middle East and North Africa (MENA), Tunisia has traditionally enjoyed a relatively diverse and market-oriented economy, with important agricultural, mining, tourism, and manufacturing sectors. Beyond tourism, the country's main export-oriented sectors include textiles and apparel, food products, petroleum products, chemicals, and phosphates, with the largest sharing going to the European Union. For many decades, Tunisia enjoyed growth rates that were higher than the MENA average, but over time the country became mired in corruption. In January 2011, the regime of President Ben Ali was overthrown, launching the "Arab Spring" but destabilizing the nation's economy. Further, fallout from the war in Libya, the continuing global economic crisis, and weaker external demand for Tunisian exports, including tourism<sup>4</sup>, have all conspired against economic growth. These events have led to reduced economic activity in many sectors, including the mining sector (chiefly phosphates and phosphate-based products), energy, tourism and transport. Agriculture and fishing, however, grew at a considerably faster pace, thanks mainly to a good cereal harvest. This hostile environment caused a drop in both domestic and foreign private investment, higher unemployment, slower growth in exports, and a drop in tourist receipts, which led to widening of the current deficit and a decrease in foreign currency assets. Table 1 provides a snapshot of the Tunisian economy.

**Table 1:** Key indicators of the Tunisian economy (2011)<sup>5</sup>

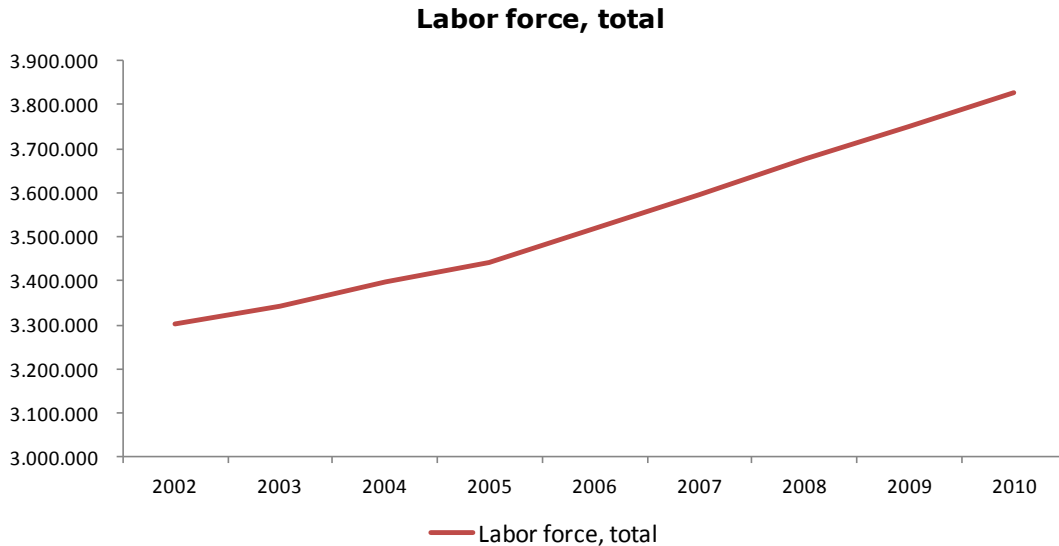
Population	10.6 million
Size of workforce (2010)	3.8 million
Gross Domestic Product (GDP)	\$45.9 billion (TND 73.3 billion)
GDP per capita (current \$)	\$4,297
Tax and other revenues as % of GDP (2009 est.)	20%
Sector breakdown of GDP	
• Agriculture	8%
• Industry	33%
• Services	58%
GDP by expenditures as % of GDP	
• Domestic demand	
◦ <i>Private consumption</i>	63%
◦ <i>Government expenditure (2010)</i>	16%
• Investment	26%
• Export of goods and services	51%
• Import of goods and services	53%

<sup>4</sup> Source: Central Bank ([http://www.bct.gov.tn/bct/siteprod/documents/rapport\\_annuel\\_anglais.pdf](http://www.bct.gov.tn/bct/siteprod/documents/rapport_annuel_anglais.pdf))

<sup>5</sup> Source: World Bank Database (2011 figures unless indicated differently)

## 2.1 Tunisian Labor Market

Despite high economic growth and a more educated workforce than many developing countries and MENA neighbors, Tunisia has long struggled to create sufficient employment for its growing labor force (ILO<sup>6</sup>).



**Exhibit 2:** Labor force development over time<sup>7</sup>

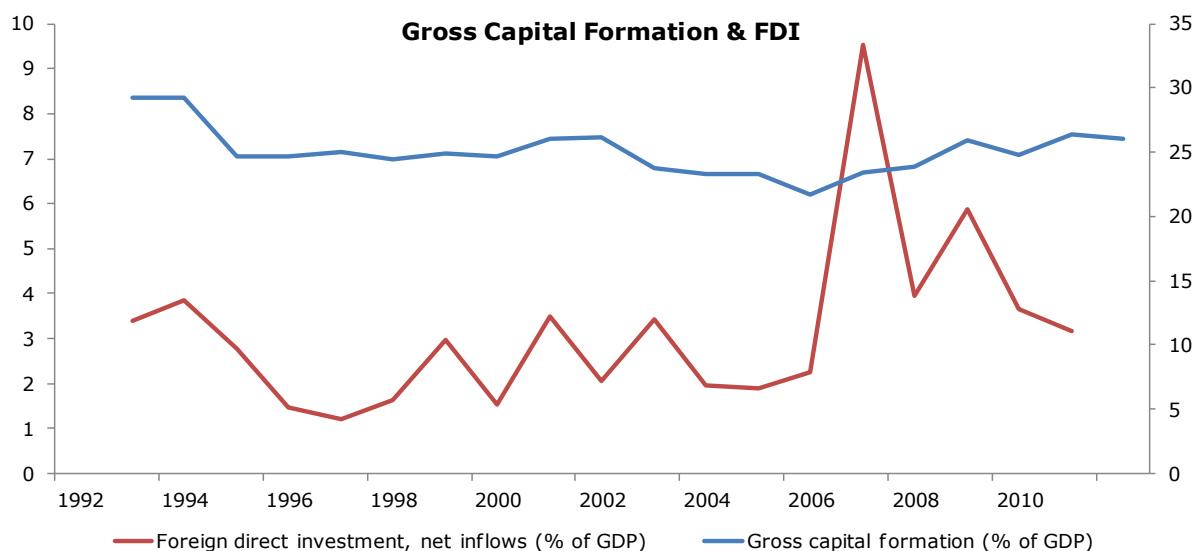
Over the period from 2002 till 2010, the Tunisian labor force has grown by 16%, from 3.3 million in 2002 to 3.8 million in 2010. Figures from the Statistical Institute of Tunisia indicate that in 2009, 34.8% of the population of 10 years or older had a secondary degree and 9.6% owned a higher degree. According to a report of the ILO<sup>2</sup>, the majority of new employment created, however, were jobs in the low-skilled segment. This has led to a mismatch between the created employment and the skills of the labor force. The unemployment rate for employment seekers with college degree rose from 14% in 2005 to close to 22% in 2009, while it fell for those with no education during the same period. This situation entails a risk of a brain drain and underlines the importance of investing into the creation of high value added jobs. It is even more important taking into consideration that the Tunisian youth unemployment rate currently lays at around 30 percent and is among the highest in the world.

## 2.2 Investment Climate

In the aftermath of the revolution in 2010/2011 in Tunisia, the country experienced low and stagnating private investment levels; indeed, investment had been on a downward trend in Tunisia even before the revolution, despite healthy rates of profit, perhaps indicating the business community's concern with the political climate. Overall, total private investment as a share of GDP decreased by 1.2 percentage points between 1990 and 2005. Tunisia is one of only three countries in the MENA region (with Algeria and Egypt) that witnessed a decline in investment as a percentage of GDP during that period.

<sup>6</sup> ILO report "Tunisia - a new social contract for fair and equitable growth", 2011

<sup>7</sup> World Bank database



**Exhibit 3:** Gross Capital Formation (GCF: right axis) and Foreign Direct Investment (FDI; left axis) as percentage of GDP; Source: World Bank Database

### 3 Economic footprint of IFC Tunisia

We distinguish between two categories of economic impact: *quantifiable* socio-economic impact related to the value-added and employment supported by IFC financing; and *qualitative* impacts, such as those related to advisory services, employee training, and sustainability programs. This analysis highlights the quantifiable impacts that arise when financing is provided to various sectors, qualitative impacts stemming from possible technical assistance are out of the scope of this research.

#### 3.1 Methodology description

Investments into Tunisian companies have an effect on the direct recipient, but will also ripple throughout the economy, creating economic impacts on suppliers, employees, raw materials and business service providers, distribution channels, and so forth. The economic reasoning underlying the approach applied in this study is that the provision of financing enables the recipient in a specific sector to, for example, purchase new machinery, enabling it to grow, increase output, and hire new workers. Each direct recipient, in turn, has many linkages with suppliers up and down its value chain in Tunisia and, as its output increases, the firm requires more inputs from them as well. In this way, it is not only the direct recipient but the entire economy that benefits from the capital injection. The financing provided can then be related to value added creation (e.g. by transforming raw materials into finished products and thus corporate profits) and employment generation throughout the Tunisian economy.

Exhibit 4 provides an overview of the rounds of impact that arise from injecting capital into an economy, defining direct and indirect impacts<sup>8</sup>. Economic convention refers to the final demand that is the result of households re-spending the money they have earned (salaries) in the economy as the “induced” effects. Since economists express some

<sup>8</sup> The “supply chain” mentioned includes next to input suppliers also distributors and transportation as it refers to all parties involved in producing and selling a good/service



concerns about possible “double counting”<sup>9</sup> of these induced effects, we have not generally included them in our reported employment figures (for more detail on the modeling approach and assumptions made, see Appendix I).

- **Direct Impact**

**Value Added related to spending of direct recipients of investments** as they hire workers, pay taxes, and purchase goods and services

- **Indirect Impact (1st)**

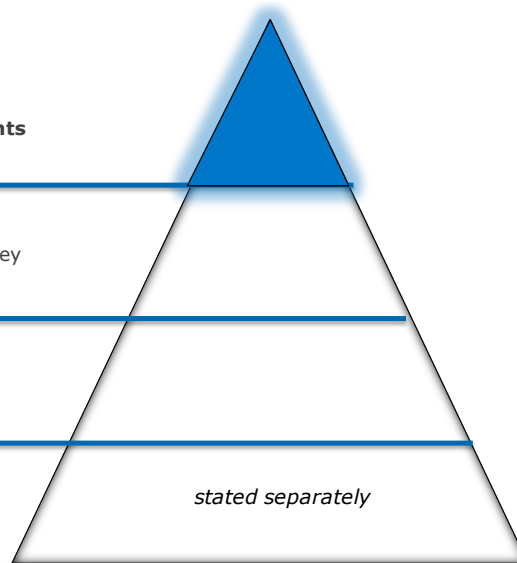
**Value Added related to the value chain** of the direct recipients as they re-spend the money received through the direct effects to e.g. suppliers

- **Indirect Impacts (2nd)**

**Value Added related to suppliers’ of suppliers** as they receive payments from suppliers of direct recipients

- **Induced Impact**

**Value Added related to spending of salaries** enabled by employee incomes generated by the direct and indirect effects



**Exhibit 4:** Direct, Indirect 1<sup>st</sup>, Indirect 2<sup>nd</sup> and Induced impacts related to IFC financing

Not all the output of a supported sector can be attributed to the newly provided capital but the injected capital has to be “translated” into associated output. For example, imagine that a company already has one machine and buys one additional one with the finance it has received from IFC, only 50% of the total output of that firm is associated with IFC. The starting point of our analysis is the share of the receiving sector’s output that can be related to the investment, the 50% from the example above. How large the related output share is depends on the receiving sector’s specific production function (see Appendix I), in other words on how productive the recipients know to use the injected capital. Following the economic logic, the related output increase leads to higher demand for intermediary products that can, in turn, be traced through the economy, leading to the various indirect effects mentioned above.

### 3.2. Strengths and Limitations of Input-Output Methodology

The major advantage of the methodology applied in this study is that it allows one to quantify the wider (direct, indirect and induced) impacts of investing in various economic sectors, both directly and through FIs, and both in terms of associated value-added (or contribution to GDP growth) and jobs. It is a rigorous, widely-accepted academic method (for which Leontief won the 1973 Nobel Prize).

However, it does have the following limitations (see Appendix I for details):

- (i) Given that the analysis is conducted for a specific moment in time, it does not take into account any structural changes of the economy (e.g. increased productivity);
- (ii) Estimates are based on historical relations, that is based on the most recent (macro) economic data available;
- (iii) Equity and debt are treated the same way;

<sup>9</sup> See, for example, William Schaffer, Regional Impact Models (West Virginia University, 1999)

- (iv) No differentiation is made by size, and hence productivity, of firms within a sector;
- (v) It does not take into account the effects of IFC's advisory services (some examples are therefore covered qualitatively in boxes);
- (vi) IFC's investments are treated as investments from any other lender and it has been assumed that IFC's financial support does not affect the relations of sectors within an economy.

Structural changes could be triggered by increasing productivity (e.g. reducing unnecessary or onerous business regulations, or improving power supply or transport infrastructure, will allow many firms to be more productive). Structural changes could also be brought about by increasing worker skill levels. So for example productivity in IFC's direct real-sector clients would be captured in this study, but productivity improvements of their suppliers would not.

Where IFC works with client companies to strengthen local linkages this would not be captured in this study. We have evidence from a more in-depth evaluation we conducted for a mining project in Ghana (see Section 4.3), that IFC's supply chain linkage program and community development program contributed to significantly stronger effects on the local economy than is usually seen in mining projects.

The proportion of the firm's revenues that can then be "attributed" to the outstanding finance is equal to the share or proportion of newly provided financing out of the borrower's total capital. This means that the various types of financing provided to the recipient (e.g. debt, equity or instruments such as guarantees) have been treated in the same way in terms of their impact on the sector's capital structure, and thus its ability to generate more output<sup>10</sup>. This is likely to underestimate the impact of equity financing, as this is generally assumed to allow companies to raise additional capital. This particular limitation of input-output modeling will therefore mean results presented are somewhat conservative. Similarly, the approach taken in this study does not allow differentiation between long- and short-term finance provided.

As the model relies on sector average productivity rates, differentiating the impact of investing in different sizes of company (e.g. large corporates, which are generally more productive, compared with investing in smaller SMEs) cannot be addressed. The same applies to direct financing versus indirect financing via FIs, where company size is one of the factors explaining the different extent of related impacts.

IFC's advisory services can help improve the investment climate, increase access to finance and infrastructure, attract private investment into sectors previously often dominated by the public sector, and strengthen the operations and local linkages of IFC client companies. We have not tried to capture these effects quantitatively, but clearly they can be significant and we provide some qualitative descriptions of such projects.

Finally, IFC's investments are often "first-of-a-kind" investments (e.g. Queen Alia International Airport and IFC's investment in the Ghanaian oil industry). These can have important demonstrative effects, leading to subsequent investments (e.g. further development of an industry; similar "public-private partnerships" in other sectors; etc).

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<sup>10</sup> Assume a company has assets with a book value of \$100, revenues of \$200 and a loan from IFC of \$15, this would mean that 15% of 200 = \$30 in revenues are attributed to IFC. Technically this assumption implies that the asset turnover (sales/assets) of companies remain constant when the company grows.

These effects were not quantitatively captured in this study, but could clearly be significant. Therefore where IFC can bring about such “transformations”, either through investments or advisory services, other assessment methods will be more appropriate.

### 3.2 Economy-wide value added of investments

To quantify the additional output that arises as results of \$1 million investments into the various sectors, we rely on capital endowment and output figures per sector, extracted for the Tunisian economy from the GTAP 8 database<sup>11</sup>. With these inputs as well as employment per sector figures, the production functions of individual sectors can be determined. The intention is to measure the role of capital in the production process, where capital endowments serve as estimation of the level of current capital services generated by the existing stock of capital goods. Production functions arrived at in this way consequently indicate the amount of capital employed at various sectors in order to produce one unit of output. In particular this relation is described by output to capital ratios. How potential investments relate to output at various sectors is shown in Table 2.

The share of total revenues of the economic sector that can be associated with an investment is to a large extent determined by the capital to output ratio, hence the capital intensity of the sector’s production function. In this context, it is important to keep in mind that the additionality of one unit of capital added to a capital intensive sector is relatively small compared to the additionality of one unit of capital provided to a relatively capital scarce sector. This is comparable to the difference between giving \$1 Dollar to someone who earns \$1 Dollar a day making him twice as rich or on the other hand giving \$1 Dollar to a person who earns \$1,000 Dollars a day affecting his wealth only slightly. Considering this effect, the ranking of the food processing, agricultural and construction sectors in Table 2 is not surprising. Higher ratios suggest a less capital intensive nature of a sector, lower ratios can be found in sectors employing relatively more capital. Whereas the general economic reasoning described above applies to all countries, capital productivity rates (output/capital) as presented in Table 2 are Tunisia specific and based on 2010 figures.

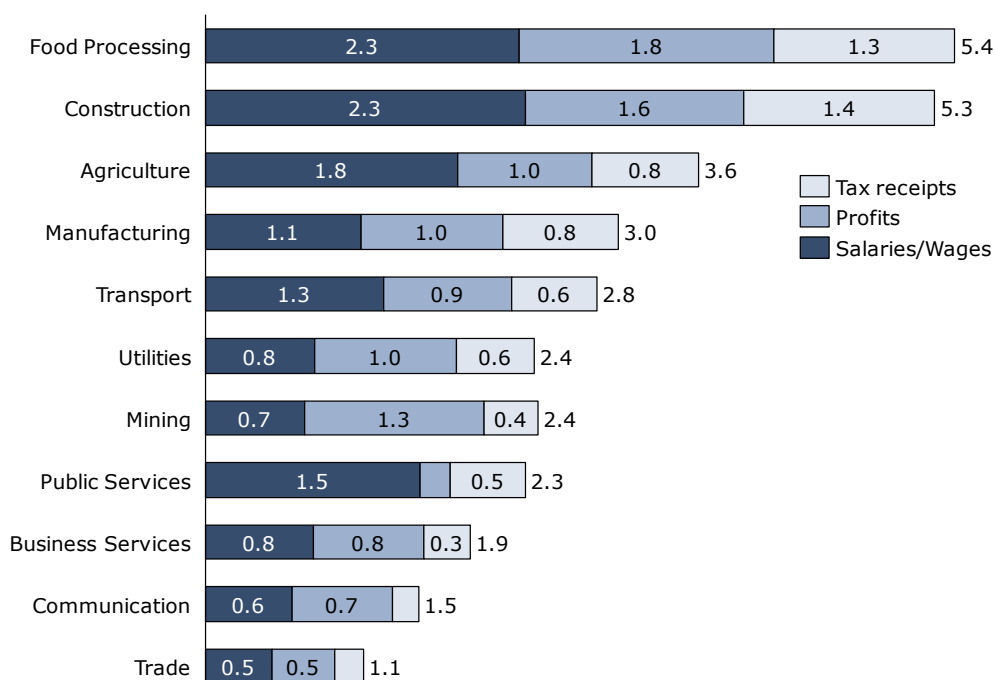
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<sup>11</sup> Global Trade Analysis Project ([www.gtap.agecon.purdue.edu](http://www.gtap.agecon.purdue.edu))

**Table 2:** Translation of investment into related output (in \$ millions)

Sectors	Investment	Output/Capital Ratio	Investment related Output
Food Processing	1,000,000	7.7	7,685,757
Construction	1,000,000	7.6	7,570,679
Agriculture	1,000,000	5.5	5,479,169
Manufacturing	1,000,000	5.2	5,151,588
Transport	1,000,000	3.8	3,844,162
Utilities	1,000,000	3.5	3,528,663
Mining	1,000,000	2.8	2,794,637
Public Services	1,000,000	2.3	2,349,372
Business Services	1,000,000	1.9	1,878,039
Communication	1,000,000	1.7	1,705,806
Trade	1,000,000	1.3	1,334,797

Taking the output attributable to investments presented in Table 2 as the starting point, Exhibit 5 quantifies the economy-wide value added related to the investment per sector, distinguishing the various types of impacts (salaries/wages, private sector profits, tax receipts). The figures summarize the effects of the receiving sector but also include the effects for the economy as a whole that come about based on inter-sector linkages of the receiving sector. That means that not all value-added mentioned here arises directly in the receiving sector.



**Exhibit 5:** Economy-wide value added associated with \$1 million investment into a specific sector by type of value-added (in \$ millions)

Even though food processing, construction and agriculture in their nature are not high-value added sectors, meaning by producing outputs of those sectors little value is added to the product, additional finance contributes relatively more to the existing capital than in other sectors. That is because of the capital scarce nature of the sector and consequently the high additionality of capital inflows. On the other hand, if a sector adds high value to the product it produces and already employs a significant amount of capital in its production process (e.g. mining), any additional investment relates to relatively fewer additional value added.

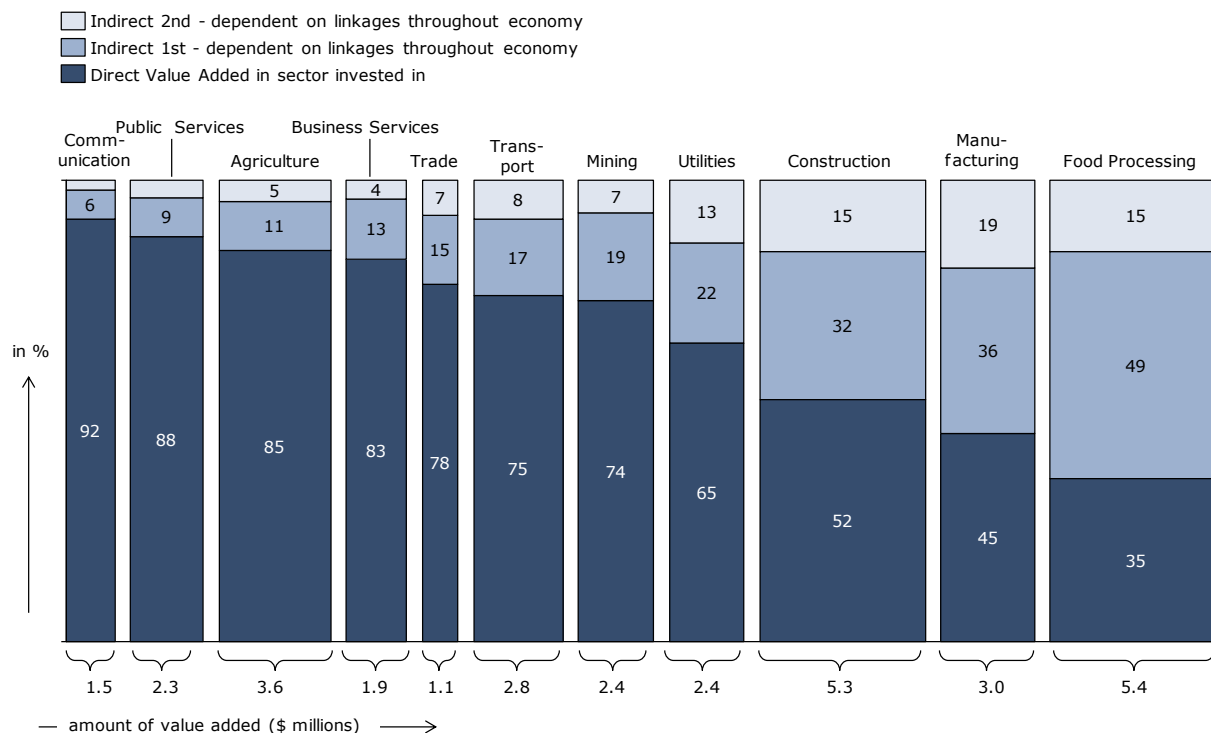
IFC's classification distinguishes more sectors than the sectoral division that has not been applied for this exercise<sup>12</sup>. While the GTAP database differentiates 57 sectors, macro-economic employment figures are only collected for 11 sectors. Data on jobs per economic sector is essential when determining the labor productivity per sector. This, in conjunction with output figures, in turn determines the amount of supported employment. Hence, based on the lack of employment data, it is not possible to break down the sectors at a more detailed level (e.g. splitting financial services and banking or education and health) even though this would be desirable.

The breakdown per type of value added as presented in Exhibit 5 can highlight strategic choices regarding the main beneficiaries from a given investment. If the objective is to maximize the relative amount of supported salaries and wages, investing into public services (67% of total value added is household income) or investing into agriculture (51% of total value added is household income) would be compelling. On the other hand, investing into mining contributes relatively more to private sector profits (54% of total value added is profits). Local government receipts are highest when investing into manufacturing, since 28% of total related value added arises in the form of tax payments. In absolute figures, food processing and construction are the preferred options for salary as well as profits and tax receipts maximization.

The effects of investment decisions, however, are both direct and indirect, in that they go beyond the firm and ripple through its entire supply chain. Exhibit 6 indicates the degree to which the value added effects are primarily generated at the level of direct recipients. Further the magnitude of indirect effects arising throughout the entire economy is shown. The exhibit thus gives insights into the economic role of a firm's value chain effects. This suggests that certain sectors, e.g. food processing and manufacturing, have a relatively high potential for creating local linkages within the Tunisian economy as they procure relatively many of their inputs from local suppliers. These linkage effects, of course, are dependent on the spending pattern of the specific sector which receives an investment, and in particular on the share of local procurement relative to the import of inputs. Furthermore, the relative capital intensity of the production in the specific sectors also plays a role.

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<sup>12</sup> For full definitions of sectors applied in this study please refer to the Appendix II



**Exhibit 6:** Economy-wide value added associated with \$1 million investment into a specific sector differentiating direct and indirect effects (various rounds in %, totals in \$ millions)

As can be seen, manufacturing in general and food processing in particular have strong linkages to the local Tunisian economy. Therefore investments into those sectors strengthen not only the receiving sectors but have strong spill-over effects to their supply chains. In the communication, public service and agriculture sector on the other hand, local (backward) linkages are less pronounced. An earlier detailed study conducted on the impact of a mine in Ghana<sup>13</sup> showed, in contrast to Exhibit 6, that only 40% (taking into account induced impacts 31%) of all value-added effects arise directly. This indicates significant spill-over effects to supplying industries found on a micro-level. The differences in macro and micro-level findings can be explained by sector average figures used in the macro study whereas micro-level analysis allows differentiating by firm.

### 3.3 Economy-wide employment of investments

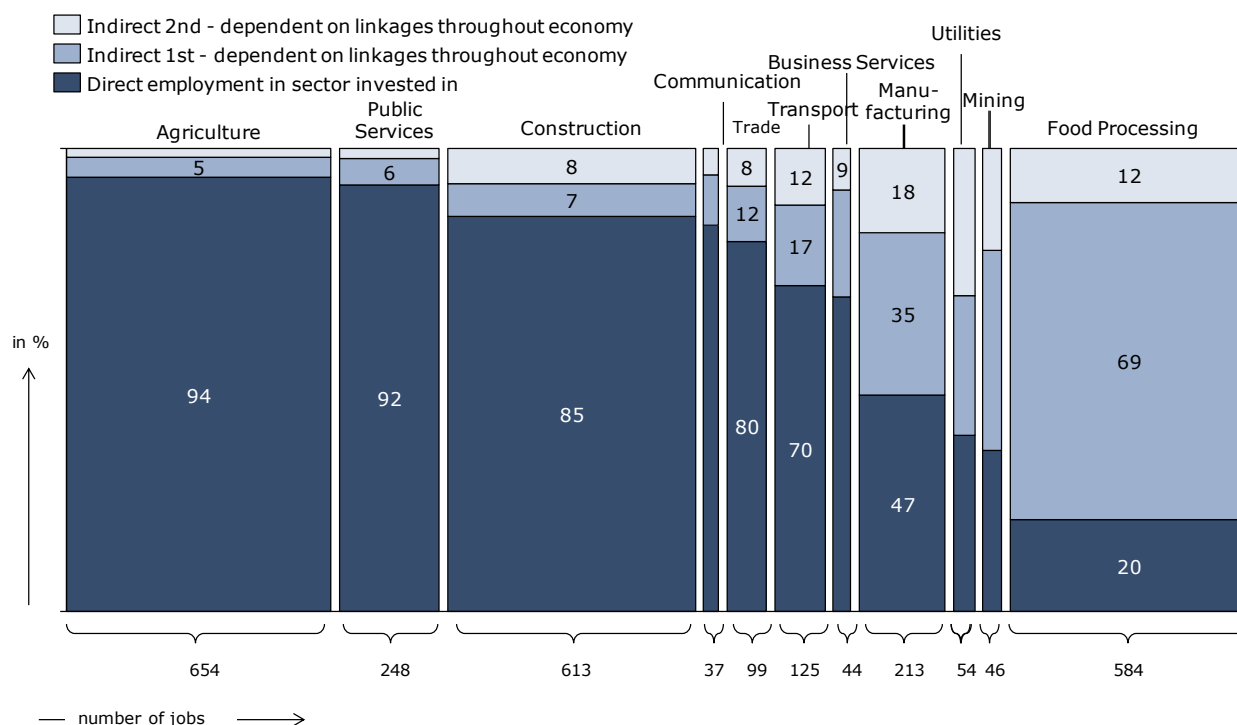
In order to quantify the impact of investments into various sectors on economy-wide employment related to that investment, the amount of labor required to produce the additional output related to the direct investment (see Table 2), as well as the higher demand for suppliers' products, has to be analyzed. This can be done using publicly available government figures. Tunisia's National Institute of Statistics (INS) collects data on employment for eighteen individual economic sectors. Taking this information from 2010 in conjunction with output figures per sector from the same year, enables determining employment intensities for various economic sectors in the Tunisian economy. The 2010 output figures per sector have been obtained by applying the RAS<sup>14</sup>

<sup>13</sup> The Socio-Economic Impact of Newmont Ghana Gold Limited, Kapstein & Kim, 2011

<sup>14</sup> Method used to update existing input-output tables with more recent data. The technique applies row and column balancing factors iteratively until the adjusted matrix (the transactions table) satisfies the row and column totals (commodity and industry output).

methodology on 2007 GTAP output figures<sup>15</sup>. It is not possible to show results distinguishing the gender of employees as employment information per sector differentiating the gender of the employed person is not available for Tunisia.

The total amount of employment supported by the investment as calculated based on the inputs described is shown in Exhibit 7 as the width of the blocks. Each block represents one sector and is on the horizontal axis broken down into the rounds of impacts. We emphasize that the total amount of associated jobs reported here excludes the job effect that is related to the induced effect of re-spending of household incomes. For an estimation of the induced impact please refer to the multipliers presented in Table 3.



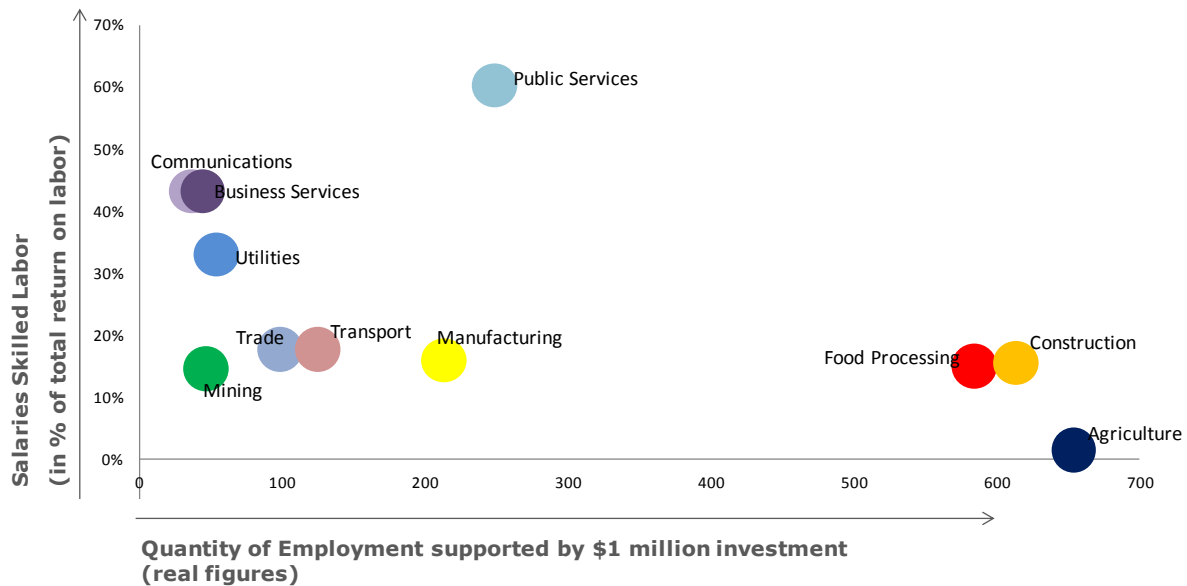
**Exhibit 7:** Economy-wide employment associated with \$1 million investment into a specific sector differentiating direct and indirect effects (in real figures)

Generally, the amount of labor related to an investment depends on the level of productivity of the sector investigated. The productivity is in turn influenced by the amount of capital employed in that sector. Agriculture, construction and food processing typically are low-productivity, labor-intensive industries. Hence, from all the sectors throughout the Tunisian economy, \$1 million invested into agriculture is associated with the largest amount of related labor. For an overview of multipliers please refer to Table 3.

Even though financing the agricultural sector leads to high related employment figures, most of it is direct agricultural employment (see Exhibit 7). This means that the investment supports relatively more direct labor and effects do not broadly spread over the economy as a whole. This becomes important when looking at the kind of employment supported. This can be expressed as % of total wages that occur to skilled labor (Exhibit 8) and value-added per job (Exhibit 9).

<sup>15</sup> Global Trade Analysis Project ([www.gtap.agecon.purdue.edu](http://www.gtap.agecon.purdue.edu))

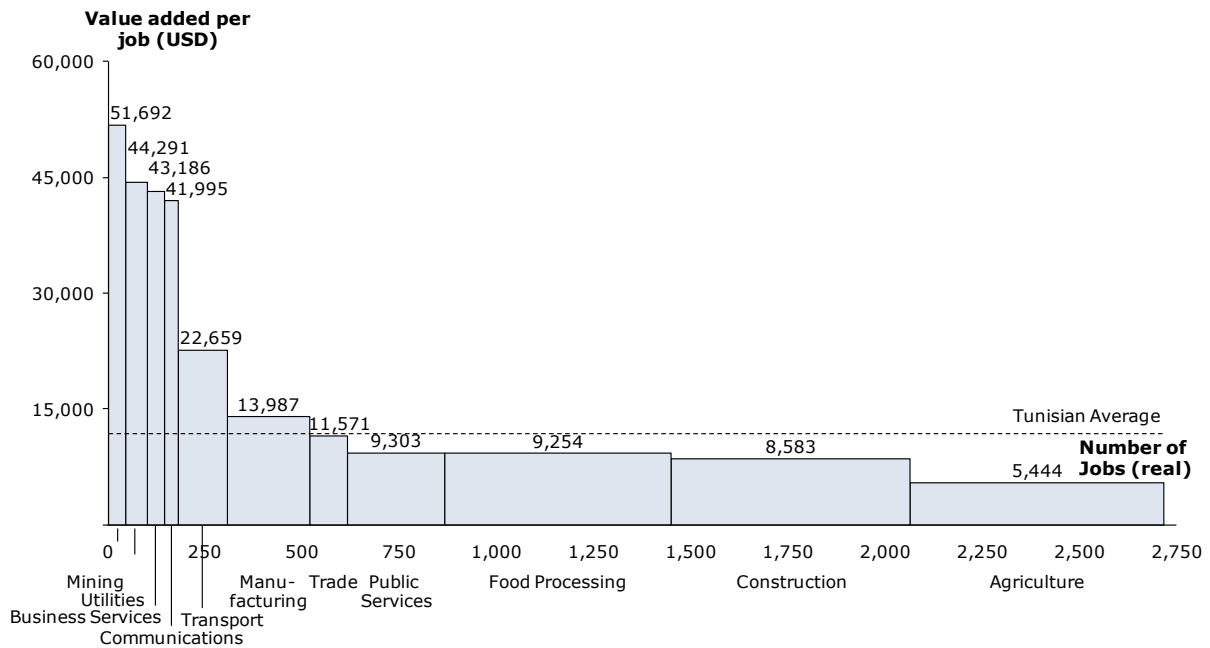
Exhibit 8 indicates the potential for investments to create income to skilled and unskilled labor throughout the economy. This potential is influenced by the kind of jobs at the receiving sector as well as on the degree and kind of linkages of the receiving sector with other sectors in the local economy (also refer to Exhibit 7). E.g. the agricultural sector employs mainly unskilled labor and has relatively few linkages to other sectors in general and to sectors that employ a high skilled labor force in particular. In contrast, even though the public services sector also has relatively few links with other sectors in the local economy (see Exhibit 5 & 7), the sector itself employs a relatively high skilled workforce and the skill level is high in related sectors as well.



**Exhibit 8:** Potential to create income for skilled/unskilled employment

Looking at it from a slightly different perspective, the kind of employment supported by a particular investment not only differs in its potential to create income for skilled and unskilled labor but also in its potential to create high or low-value added employment. The latter takes efficiency and productivity levels of the various sectors into account. From a development economic point of view, in the long-run employment is needed that adds relatively more value-added. That way an economy can make the transition from an agricultural to a more services oriented economy with higher average incomes. Therefore, job creation is not only about the absolute numbers (Exhibit 7) but also about the value added per supported job (Exhibit 9). Consequently, policy makers face a tradeoff between the amount of employment and the type of employment generated. High multipliers can in this context also be an indicator of economic inefficiency indicating low rates of productivity. The multipliers per economic sector are discussed in more detail in Section 3.4.





**Exhibit 9:** Value added per job associated with IFC financing in various sectors (\$)

In Exhibit 9 the absolute numbers of supported employment are depicted against the value added contribution per job. Hence, The surface area of the blocks indicates the total value added per job for each of the sectors. The average GDP per worker in Tunisia is \$12,100<sup>16</sup>. Not surprisingly, due to the labor intensive nature of the sectors and few spill-over effects to other sectors in the economy, workers in the construction and agricultural sectors generally contribute less to the Tunisian GDP than this average figure.

### 3.4 Value added and employment generation multipliers

Summarizing the findings discussed in Sections 2.2 and 2.3, the multipliers presented in Tables 3 and 4 indicate how much value added and employment is generated throughout the local Tunisian economy (direct, indirect and induced effects) by investing \$1 million of finance into various economic sectors.

<sup>16</sup> From Table 1: GDP 2011 (\$45.9 billion)/ employed labor force 2010 (3.8 million) =12,100 GDP/worker

**Table 3: Value added and employment associated with financing of \$ 1 million**

Economic Sector	Economy- wide value added associated with USD 1 million		Economy- wide employment associated with 1 USD million	
	Direct/Indirect	+ Induced	Direct/Indirect	+ Induced
Food Processing	5.4	+ 26%	584	+0%
Construction	5.3	+ 27%	613	+ 16%
Agriculture	3.6	+ 31%	654	+ 12%
Manufacturing	3.0	+ 23%	213	+ 22%
Transport	2.8	+ 28%	125	+ 44%
Utilities	2.4	+ 20%	54	+ 63%
Mining	2.4	+ 18%	46	+ 66%
Public Services	2.3	+ 41%	248	+ 27%
Business Services	1.9	+ 25%	44	+ 176%
Communication	1.5	+ 25%	37	+ 33%
Trade	1.1	+ 25%	99	+ 21%
<b>Weighted Average</b>	<b>USD 2.9 mln</b>	<b>+ 26%</b>	<b>247</b>	<b>+ 18%</b>

Table 3 shows that the relatively capital scarce sectors (e.g. agriculture, construction) generally have higher multipliers<sup>17</sup> compared to more capital intensive sectors like mining. Higher additionality of capital injected to capital scarce sectors can be explained by the fact that it takes relatively little capital to increase efficiency and productivity in those sectors. In addition not captured by the figures presented above, capital scarce sectors like agriculture typically encounter more difficulties accessing finance as they are less formalized than more capital intensive sectors. Investments especially into those sectors can overcome those obstacles and contribute to value added and employment creation to a larger extent.

The multipliers shown above apply to the economy-wide average impact of the typical company in the various sectors. Deviations from the average can arise from a company's size and its capital intensity. Average firms are more likely to be found in the portfolio of financial institutions (FIs). Elsewhere<sup>18</sup> we found that direct private sector (non-FI) investments typically mainly focus on a few large, capital intensive companies. This economic reasoning also applies to the multiplier differences that arise between sectors.

As pointed out earlier, the multipliers as presented above do not take into account any transformational effects of IFC finance since those cannot be quantified using the suggested approach. IFC's Enterprise Survey however offers another way of looking at the impact that IFC investments into Tunisia might have. The survey indicated that about 40% of firms in the region identify access to finance as major constraint to doing business.

<sup>17</sup> Multipliers are defined as direct & indirect effects arising per \$1 million invested into the various sectors. The induced impacts are given as % of the direct/indirect multiplier. The total multiplier is hence calculated: direct/indirect multiplier x (1+ induced percentage).

<sup>18</sup> Socio-Economic Impact of IFC Financing in Ghana/Jordan; Steward Redqueen, 2012

Providing finance can consequently be assumed to have substantial catalytic effects for the development of the country. An even larger issue appears to be the lack of electricity. 50% of companies regard the supply of electricity as a major constraint to growth. Hence, investing into power plants can be relevant for improving the circumstances in which businesses operate and can contribute to value added creation relatively more than the multiplier in Table 4 suggests. In those areas IFC investments can be seen as having a 'transformational' effect as any improvement of power supply positively contributes to the long term development of the country.

**Table 4:** Major business constraints as identified by Middle East and North African firms<sup>19</sup>

<b>% of firm identifying as a major constraint:</b>	<b>Middle East &amp; North Africa</b>
Access to Finance	36.3
Electricity	47.7
Transportation	25.1

<sup>19</sup> Source: IFC Enterprise Survey, 2006 (no study specifically conducted for Tunisia)

#### 4. Conclusions and Recommendations

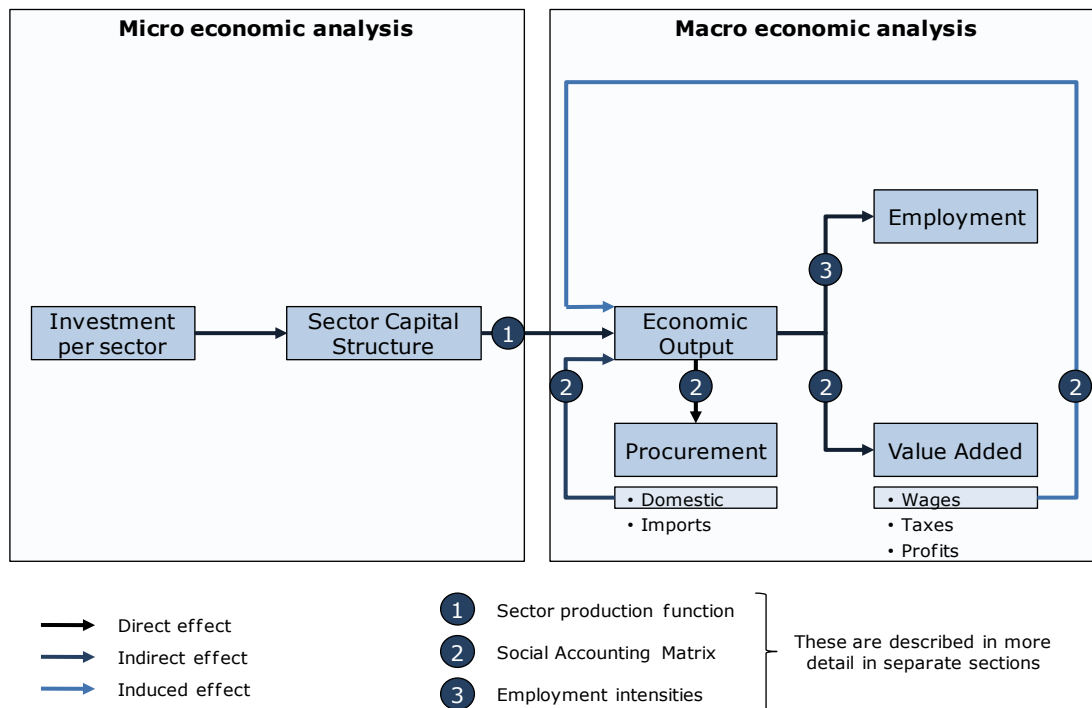
The objective of this study was to provide a forward-looking, quantitative assessment of the potential impact of IFC financing on various sectors of the Tunisian economy in terms of generating employment and value-added. In particular, the IFC seeks to gain insights into its portfolio decisions by examining in greater depth the transmission belt between investments on the one hand and broader economic outcomes on the other. If the IFC wishes to magnify its economic impact to an even greater extent than it has done in the past, it might wish to consider the following conclusions and recommendations that flow from the Report:

1. To the extent that the IFC seeks to deploy its capital to generate more employment in Tunisia, it needs to recognize the tension between financing well-capitalized companies, which results in increased labor productivity but generates relatively few additional jobs, versus financing capital scarce sectors, which allows them to bolster output and create, on average, more jobs throughout the economy. In particular, investing into agriculture, construction and food processing leads to the highest amount of employment generation, whereas those sectors provide rather many jobs with low value added contribution.
2. The IFC must recognize the further trade-off between pursuing the aim of maximizing the overall quantity of employment supported versus the value-added per worker. Although creating jobs is clearly an important objective of public policy, this is usually accompanied by an interest in creating “good” jobs or what the International Labour Organization calls “decent work.” In Tunisia, investing in mining, utilities, business services and communications yields the highest levels of value-added per worker.
3. Another distinction that needs to be made, is the difference between direct and indirect impacts of a financing decision. Although some firms may have relatively low direct impacts on, for example, employment generation, they may make use of a labour-intensive supply chain. These effects should also be taken into account, and again in the Tunisian case it is worth considering that the food processing sector has a high potential for strong backward linkages.
4. It is also important to recognize that the relative level of value-added differs across sectors; thus some financing decisions will benefit certain components over others:
  - Financing the public services sector and agriculture maximizes the salaries and wages earned by workers;
  - Financing manufacturing maximizes the amount of tax receipts of the Tunisian government;
  - Financing mining maximizes the profits earned by private sector companies.
5. While this Report has emphasized IFC’s financing decisions to particular sectors, it is important to recall that supporting labour market institutions (and associated institutions) require investments in public goods as well, including education that generates human capital; social safety nets that motivate individuals to invest in their human capital and to engage in risk-taking; and a business climate that helps drive and support private sector investment.

## Appendix I Model description

### I.1 Modeling approach

The approach developed for this study is based on the socio-economic impact assessment (SEIA) models and combines investments of \$1 million into various economic sectors with a so-called Social Accounting Matrix (SAM) of the Tunisian economy and the allocation of the workforce over the various economic sectors. A SAM describes inter-industry linkages in an economy, depicting how the output of one industry goes to another, where it serves as an input. It therefore essentially makes one industry dependent on another, both as customer of outputs and as supplier of inputs. Exhibit I.1 depicts an overview of the modeling approach, including the information sources used to arrive at the two main model outputs.



**Exhibit I.1:** Overview of the modeling approach

### I.2 Production Function

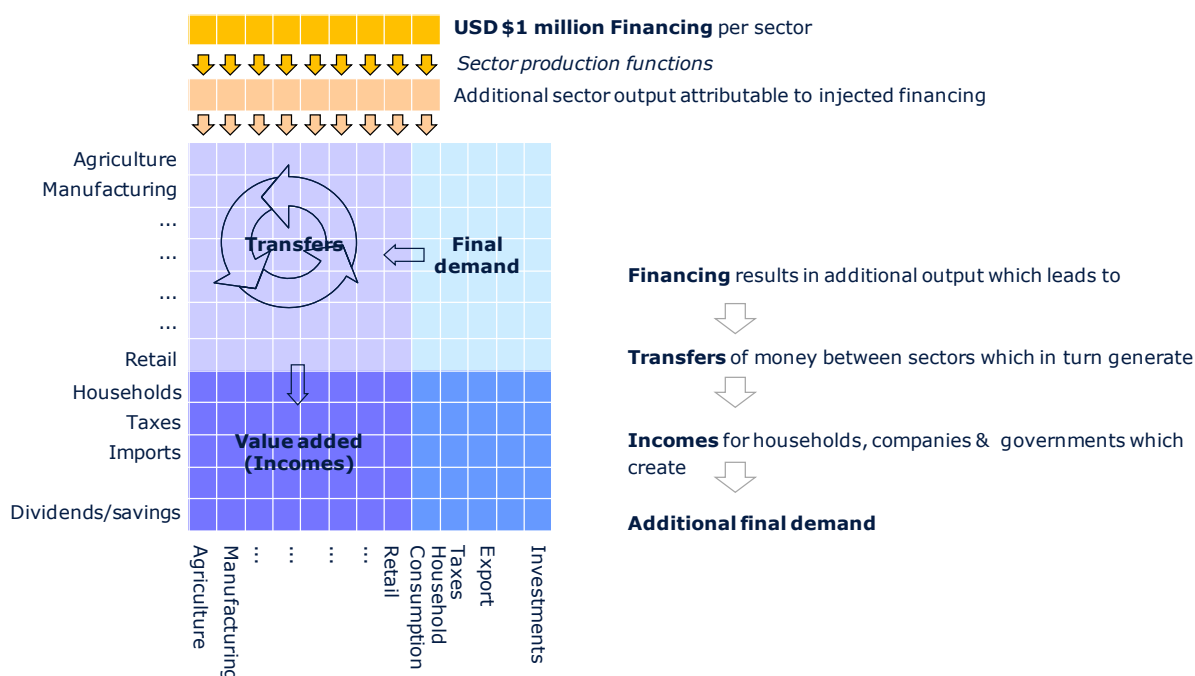
Investments have been “translated” into sector output based on the “economy-wide” sector production function that depends on the sector’s capital structure. A production function describes the sector’s economic output as a function of its inputs, namely capital and labor:  $P = f(L,K)$ . Although classic production functions are written in terms of physical outputs we have used economic output in order to more easily incorporate different firms. Labor (L) has been measured in terms of the Full Time Equivalent (FTEs) and Capital (K) has been defined as Capital Employed (defined as total assets in \$). Rather than the more data intensive Cobb-Douglas production function, due to data constraints we have chosen for the Leontief Production Function.

All expenditures necessary to produce the output share related to investment made can then be traced through the Tunisian economy estimating the associated value added and employment created.

### I.3 Social Accounting Matrix

The key ingredient of the model is the Social Accounting Matrix (SAM). The SAM describes the financial flows of all economic transactions that take place within the Tunisian economy. It is a statistical and static<sup>20</sup> representation of the economic and social structure of Tunisia. As shown in Exhibit I.2, in the SAM the number of columns and rows are equal because all sectors or economic actors (industry sectors, households, government and the foreign sector) are both buyers and sellers. Columns represent buyers (expenditures) and rows represent sellers (receipts).

Of the four quadrants in the SAM, three are relevant here. Final *consumption* induces production which leads to financial *transfers* between the various sectors which subsequently generates *incomes* for households, governments (taxes) and profits (dividends and savings). For Tunisia, the most recent SAM dates back to 2007 and has been taken from the GTAP 8<sup>21</sup> database.



**Exhibit I.2: Social Accounting Matrix**

The last step in constructing the SAM is to normalize it such that all columns add up to one. Then spending of sectors invested in can be traced in money terms throughout the economy. In doing so, the economic effect related to the finance they obtained can be divided into three effects:

1. **Direct effects:** effects arising directly at sectors invested in (e.g. jobs and salaries paid by the receiving sector).
2. **Indirect effects (value chain):** effects arising at supplying sectors of the sector invested in arising from procurement of intermediary products/services to produce the additional output related to the investment.

<sup>20</sup> SAMs are valid for a specific year. Economies are subject to change and SAMs must be updated periodically.

<sup>21</sup> Global Trade Analysis Project ([www.gtap.agecon.purdue.edu](http://www.gtap.agecon.purdue.edu))

3. **Indirect effects (suppliers of direct suppliers):** effects arising at suppliers' of suppliers directly cooperating with sectors invested in (e.g. jobs and salaries provided by suppliers' suppliers);
4. **Induced effects:** effects due to the increased expenditures of households enabled by the increasing incomes generated by the direct and indirect effects. These have been separated out due to concerns about potential "double-counting."

#### I.4 Assumptions

*1. Constant returns to scale, constant technology and constant capital & labor productivity*  
 For all sectors, the Social Accounting Matrix (SAM) implicitly assumes Leontief (linear) production functions in which the inputs increase proportionally with output. Across the economy and over not too long a period, this assumption is possibly not overly restrictive, as new technologies and business practices take time to translate into higher productivity. Input-output modeling is not capable of reflecting transformative change such as comes with, say, the introduction of cell phone or internet technology. For this reason, SAMs are periodically (or sometimes sporadically) updated. Only by studying the change of SAMs over time can one infer the effect of transformative technology of business practices. If one were to update the SAMs every five years or so, and assume technology was constant during the period, one would incorporate the transient change of technology in a quasi-steady way. This, however, would not quantify IFC's contribution to this (transformative) technology change. In input-output modeling, the marginal capital and labor productivities are equal to overall capital and labor productivity. Although in reality one would expect diminishing marginal returns to scale, the lack of skills and capital typically present in emerging markets probably mean that this is a reasonable assumption. For firms with good access to finance (possibly IFC clients), however, the assumption is more restrictive. Using, as proposed, Cobb-Douglas production functions for these companies will improve results but only in terms of the "direct" impacts.

*2. Different products within one sector have identical cost structures*

Although economies of scale and scope surely influence the production process within an individual company, we assume that production processes are not too dissimilar across a sector. This restrictive assumption could only be relaxed with more disaggregated data.

*3. Demand is totally inelastic and input structures are fixed*

In a SAM, the use of inputs does not depend on price but only on final demand. Unreasonable as it may sound, this assumption may not be overly restrictive unless one supposes that firms are price-makers instead of price-takers. More restrictive is that the production function relies on a fixed proportion of inputs (i.e. no substitution takes place). Again, this may not be problematic over a given time-horizon.

*4. Supply of inputs is totally elastic*

Supply of labor intensive products can be expected to be fairly elastic for unskilled labor. For skilled labor this would be more problematic. Inputs from capital intensive industries will typically violate this assumption, as capital is typically scarce in emerging economies and economic impact would then be overestimated.

*5. Time invariance*

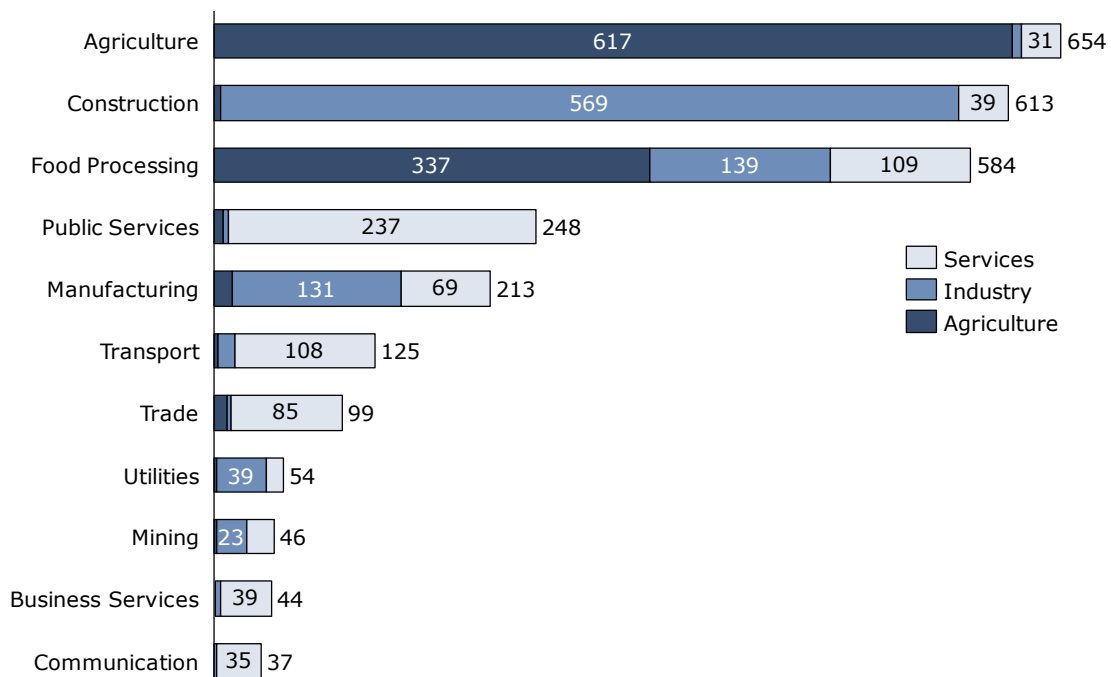
Input-output modeling yields a "snapshot in time". In a sense, it is as if the effects of any IFC intervention result in a new "steady state" immediately. In reality, of course, it would

take a substantial amount of time for these effects to percolate through the economy. In other words, the methodology produces a snapshot of the economy and does not take the date of a financing intervention into account.

To model these kinds of time changes one would need to apply Computational General Equilibrium (CGE) models. These models are however much more data intensive and it is highly unlikely that one could apply them in most emerging economies. Even if one could, inaccuracies in the data would probably multiply to the point where any results would be highly questionable. In addition, attribution of any changes to IFC become increasingly difficult as time proceeds, as a growing number of exogenous and endogenous events will exert their influence. Obviously, the results should be assessed accordingly.



Appendix II: Additional breakdowns



**Exhibit II.1:** Breakdown of employment per sector associated with investments (in real amounts)

### Appendix III: Overview of sectors

The overview below provides an overview of the sub sectors included in each of the sectors used in this report.

<b>Agriculture</b>
<ul style="list-style-type: none"> <li>Paddy rice</li> <li>Wheat</li> <li>Cereal grains</li> <li>Vegetables, fruit, nuts</li> <li>Oil seeds</li> <li>Sugar cane, sugar beet</li> <li>Plant-based fibers</li> <li>Crops</li> <li>Bovine cattle, sheep and goats, horses</li> <li>Animal products</li> <li>Raw milk</li> <li>Wool, silk-worm cocoons</li> <li>Forestry</li> <li>Fishing</li> </ul>
<b>Industry (Manufacturing/Mining/ Utilities/ Construction)<sup>22</sup></b>
<ul style="list-style-type: none"> <li>Coal</li> <li>Oil</li> <li>Gas</li> <li>Minerals</li> <li>Bovine meat products</li> <li>Meat products</li> <li>Vegetable oils and fats</li> <li>Dairy products</li> <li>Processed rice</li> <li>Sugar</li> <li>Food products</li> <li>Beverages and tobacco products</li> <li>Textiles</li> <li>Wearing apparel</li> <li>Leather products</li> <li>Wood products</li> <li>Paper products, publishing</li> <li>Petroleum, coal products</li> <li>Chemical, rubber, plastic products</li> <li>Mineral products</li> <li>Ferrous metals</li> <li>Metals</li> <li>Metal products</li> <li>Motor vehicles and parts</li> <li>Transport equipment</li> <li>Electronic equipment</li> </ul>

<sup>22</sup> Construction is sometimes shown separately throughout this study

	<p>Machinery and equipment          Manufactures          Electricity          Gas manufacture, distribution          Water          Construction</p>
<b>Retail</b>	
	<p>All retail sales          Repairs of motor vehicles and personal and household goods          Retail sale of automotive fuel</p>
<b>Wholesale</b>	
	Wholesale trade and commission trade
<b>On-Trade</b>	
	Hotels and Restaurants
<b>Transport (Transport/Communication)</b>	
	<p>Transport          Water transport          Air transport          Communication</p>
<b>Services (Financial/ Public/ Social Services)</b>	
	<p>Insurance          Business services          Public Administration, Defense, Education, Health          Dwellings          Recreational and other services</p>

## About the authors

### *Company profile*

Steward Redqueen is a strategy consultancy firm that aims to magnify the positive impact of the private sector on society. It is represented in Amsterdam, Luxembourg, Barcelona and New York and executes projects around the world. As specialists since 2000, Steward Redqueen focuses on integrating sustainability, quantifying impact and facilitating change. Clients appreciate our rigorous analysis, our ability to solve complex problems, and being ahead of the curve. We work for (multinational) corporations, (development) financials and public sector organizations. Since 2006 Steward Redqueen has completed more than 50 socio-economic impact studies for multinational mining companies, development finance institutions, multinational food & beverage firms, banks and recreational organisations, in Asia, Africa, Latin America and Europe.

More information, visit: [www.stewardredqueen.com](http://www.stewardredqueen.com)

### *Socio-economic impact assessments (SEIA)*

Foreign direct investment (FDI) has been a source of controversy for many decades. Supporters of FDI point to the benefits of adding foreign capital to domestic savings and to the employment, technology transfer, and (in many cases) exports that are generated. Detractors assert that FDI crowds out domestic firms and suppliers, while contributing little to government tax revenues. Our Socio-Economic Impact Assessments go beyond assertions in an effort to quantify the direct and indirect impacts of firms in the countries in which they are active. On these projects we work together with Professor Ethan B. Kapstein of Georgetown University (Washington, DC), who is an associate partner of Steward Redqueen.

### *Ethan B. Kapstein*

Ethan B. Kapstein, associate partner Steward Redqueen, is currently Visiting Professor of Global Strategy at Georgetown University in Washington DC. Previously he held positions at INSEAD, Harvard University, the University of Minnesota, and the Organization for Economic Cooperation and Development. A former international banker and naval officer, Prof. Kapstein serves as an economic and strategy consultant to government agencies and many of the world's leading multinational corporations. His latest books are *Economic Justice in an Unfair World* and *The Fate of Young Democracies*.

### *René Kim*

René Kim is founding partner of Steward Redqueen. He has worked with many multinational companies and private equity funds in both developed and emerging markets. Previously, he worked for the Boston Consulting Group in Amsterdam and as an academic at the Massachusetts Institute of Technology. He has a PhD cum laude in Hydrology and Meteorology and is the author of many academic articles. The authors were assisted by Hedda Eggeling of Steward Redqueen.