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EQuIP

Enhancing the Quality of Industrial Policies

TOOL 5

Industrial Employment and Poverty Alleviation

EQuIP Tool 5:

Industrial Employment and Poverty Alleviation

Summary Sheet

Enhancing the Quality of Industrial Policies (EQuIP) – Tool 5	
Name of the tool:	Industrial Employment and Poverty Alleviation
Objective:	The aim of this tool is to provide analysts with some simple and intuitive diagnostic methods, which can help them to promote a process of structural change, which generates widespread, quality employment and contributes to poverty alleviation.
Key questions addressed:	How efficiently is industrial development generating more and/or jobs for your population? Which industrial sub-sectors are generating the most/least productive employment opportunities? In which sub-sectors is increased productivity contributing the most/least to rising incomes? What is the relationship between the formal and informal manufacturing sector and how does this impact the livelihoods of formal and informal workers? What are the potential indirect employment effects of industrial activities and how could industrial interventions ensure more broad-based sectoral growth through stronger linkages? Which sub-sectors are contributing most to poverty alleviation as they expand (on the basis of formal/informal employment, wage generation, skill requirements and gender dynamics)?
Indicators used:	Poverty Rate Employment Composition (Economy & Manufacturing (Formal and Informal) Employment Growth Rate (Manufacturing & Sub-sector (Formal and Informal) Manufacturing Value Added Growth Rate (Manufacturing & Sub-sector (Formal and Informal) Employment elasticity (Manufacturing & Sub-Sector (Formal and Informal)) Manufacturing Wage Bill/MVA Manufacturing Sub-Sector Wage Rates Relative to Minimum Wage (or GDP/Capita) for Formal & informal Sector Wage Growth Rates (Manufacturing and Sub-Sector (Formal & Informal)) Manufacturing Sub-sector Wage Elasticity of Productivity (Formal & Informal) Manufacturing Sub-Sector Female Share of Employment (Formal & Informal) Manufacturing Sub-Sector Gender Wage Gap (Formal & Informal)

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1. Introduction

The fundamental objective of the *Industrial Employment and Poverty Alleviation Tool* is to equip analysts in lower-income countries with some simple and intuitive diagnostic and strategy setting tools, which can help them to integrate productive employment generation and poverty alleviation considerations into their industrial policy formulation. Industrial policy implies the direct involvement of the government in supporting strategic economic sectors and activities. One of the core challenges facing lower-income countries is to generate quality job opportunities and reduce poverty through economic development. The indicators and methodologies presented in this tool are not designed to lead to any definite strategic conclusions, but rather are meant to help analysts examine various social dynamics at play in their industrial sectors so they are in a better position to promote and defend priorities of poverty alleviation and productive employment generation in their industrial strategy setting process.

The Industrial Employment and Poverty Alleviation Tool has been developed with lower income countries in mind, meaning that there are some important underlying assumptions. The first is a serious appreciation of poverty or a lack of broad-based needs fulfilment. In such situations of deprivation, we can assume large *under*employment with large segments of the population being trapped in agriculture and informal services. These activities are generally characterised by low-productivity, which translates into low wages and thus, low standards of living for workers. For poor populations, the only asset they generally have to improve their incomes is their own labour, which makes *productive employment generation* a critical driver of poverty alleviation. The notion of *Productive Employment* is commonly emphasised in the international community and although there are many definitions, in this tool we use the simple definition where productive employment equates to *employment opportunities with rising productivity and wages*.

Historically, industrialisation has been a core driver of broad-based poverty alleviation through its direct and indirect employment effects. In developing economies, the manufacturing sector tends to have higher productivity than agriculture and services and therefore its expansion plays an important role in poverty alleviation through the direct absorption of the underemployed and working poor into occupations that offer higher wages. Furthermore, the manufacturing sector has traditionally had very strong forward and backward linkages, which means that when industry grew there were strong positive spill over effects in terms of employment and income generation across value chains. Recent history has witnessed, however, increasing instances of "jobless growth" driven by rapid labour productivity gains. This tool therefore strives to educate and illustrate the short-term trade-offs, which can occur between a labour-intensive and productivity-intensive industrialisation trajectory. At earlier stages of development, labour-intensive industries play a very important role in direct employment generation as they not only create new job opportunities but also require lower-skill sets that can allow for the integration of poor populations. However, there are also social benefits that arise from a rapid productivity growth, as it *should* translate into rising wages for workers, which is vital for rising standards of living. The *Industrial Employment and Poverty Alleviation Tool* therefore can help government analysts evaluate the relative social benefits of various manufacturing activities either in regards to its labour-intensity of its ability to generate rising wages from productivity gains.

This tool begins by "Setting the Stage" and examines a countries relative performance in terms of poverty alleviation, structural change (e.g. the employment composition of the economy) and evaluates how efficiently manufacturing is generating more and/or "better" jobs for their populations. As part of this initial assessment we will also draw form *Tool 1: Industrial Expansion and Growth* and examine how employment dynamics relate to manufacturing productivity and value added trends. The tool then examines the social dynamics occurring *within* manufacturing and helps to identify activities with rising employment, productivity and wages.

As this tool is designed to maximize poverty alleviation, it emphasizes the importance of examining both formal and informal employment dynamics, as informal manufacturing enterprises can be

the first entry point for the working poor into industrial employment. Along these lines we will also want to consider the skill requirements of different manufacturing activities to ensure that the industrial structure is generating employment opportunities that are accessible to the poor in the short-term. In the long run, we will want to look at capabilities development through education and training to allow for progressive development of more complex industrial activities but these capability dimensions will be examined in (*Tool 9: Industrial Capabilities)*.

Finally, we will want to examine the gender dynamics occurring within the manufacturing sector as women's economic empowerment is one of the most powerful mechanism for poverty alleviation in low-income countries. Once analysts have identified some priority manufacturing activities, they will then want to consider the potential positive *indirect effects* of various sector's expansion and can use benchmarking to assess relative performance and set targets for development. The Industrial Employment and Poverty Alleviation Tool has therefore been divided into six sections: 1) *Setting the Stage* 2) *Sub-Sector Employment Analysis* 3) *Sub-Sector Wage Analysis* and 4) *Maximising the Inclusiveness of Industrial Development* 5) *Estimating Indirect Effects and 6) Setting Targets*.

2. Setting the Stage

As the EQuIP toolbox has been developed to assist industrial analysts in low and lower-middle income countries, the case study of Ethiopia is used to illustrate how the *Industrial Employment and Poverty Alleviation Tool* can be applied within lower-income country context. While Ethiopia is the central country of analysis, we will also want to evaluate its performance by comparing it with other relevant countries. In this example, Malawi, Egypt and Kenya were chosen as comparator countries. In many instances there will not be data available for all countries in all years, which is a realistic challenge that low-income countries in particular will come up against when applying this Toolbox. However, these challenges are not insurmountable and despite data limitations we can still use these indicators to get a solid understanding of the social performance of countries' industrialisation.

In this first "Setting the Stage" Analysis, we will use some simple indicators to better understand the social performance of industry. We will begin by examining the National Poverty Rate and Employment Composition, as this can help to reflect the current status of structural change and establish the relative need for countries to promote a pro-poor industrialisation strategy. From this point we can then analyse how efficiently the industrial structure is generating productive employment opportunities and how much the benefits of industrialisation are being shared with workers. This beginning analysis will therefore assess the relative performance of industry so that they can design interventions that maximize on the social benefits of industrialisation.

Methodology

1) National Poverty Rate (Poverty Headcount Ratio at US$ 2 a day (PPP))

Strategic Questions:

How urgently does your country need productive employment opportunities and an employment intensive industrialisation to reduce poverty?

Data and Sources for Computing National Poverty Rate

Indicator	Variable	Source
Poverty Rate	Poverty Rate	World Bank's World Development Indicators (WDI)

Illustrative Method:

Use single numbers or line graphs to show trends and relative performance (with comparator countries)

2) Employment Composition

Strategic Questions:

Has there been structural change in employment?

What is the absorptive capacity of the industrial sector and other sectors?

How do our industrial employment trends compare with other countries?

Data and sources for computing employment composition of an economy

Indicator	Variable	Source
Employment Composition	Sector Employment	International Labour Organization's Database (ILOSTAT)
	Total Employment	ILOSTAT

Illustrative Method:

Stacked Bar Chart (showing multiple years and multiple countries)

Note: This analysis should be complimented with an examination of the Structural Change Indicator (MVA/GDP) outlined in *Tool 1: Industrial Capacity and Growth*.

3) Employment Elasticity of Industrialisation

Strategic Questions:

How quickly is the country industrialising and generating manufacturing and employment opportunities?

How efficiently is industrial development generating employment?

Is the country experiencing employment-led growth or jobless growth in the industrial sector?

Data and sources for computing employment elasticity of industrialisation

Indicator	Variable	Source
Employment Elasticity	Δ Manufacturing Employment (ML)	ILOSTAT or United Nations Industrial Development Database (INDSTAT)
	Δ Real Manufacturing Value Added (MVA)	INDSTAT or WDI

Illustrative Method:

Create table that outlines Employment and MVA Growth Rates as well as the Employment Elasticity. Use Conceptual Device 1 (see analysis and interpretation of findings section) to classify countries relative performance in terms of employment generation via industrialisation.

4) Labour Productivity

Strategic Questions:

Is the manufacturing sector innovating over time?

Are productive employment opportunities being generated in the manufacturing sector?

Data and sources for computing manufacturing labour productivity

Indicator	Variable	Source
Labour Productivity	Real Manufacturing Value Added (MVA)	INDSTAT or WDI
	Manufacturing Employment (ML)	ILOSTAT or INDSTAT

Illustrative Method:

Line graph or bar chart (illustrating multiple years and countries). You could also create a table which shows labour productivity growth rates.

5) Wage Intensity of Industrialisation

Strategic Questions:

How efficiently is industrial development generating higher wages for workers?

How does the wage intensity of your industrialisation compare with other countries over time?

Data and sources for computing wage intensity of industrialisation

Indicator	Variable	Source
Wage Intensity	Wage Bill	INDSTAT
	Nominal Manufacturing Value Added (MVA)	INDSTAT

Illustrative Method:

Line graph that benchmarks performance against other countries over time

Analysis and Interpretation of Findings

National Poverty Rate

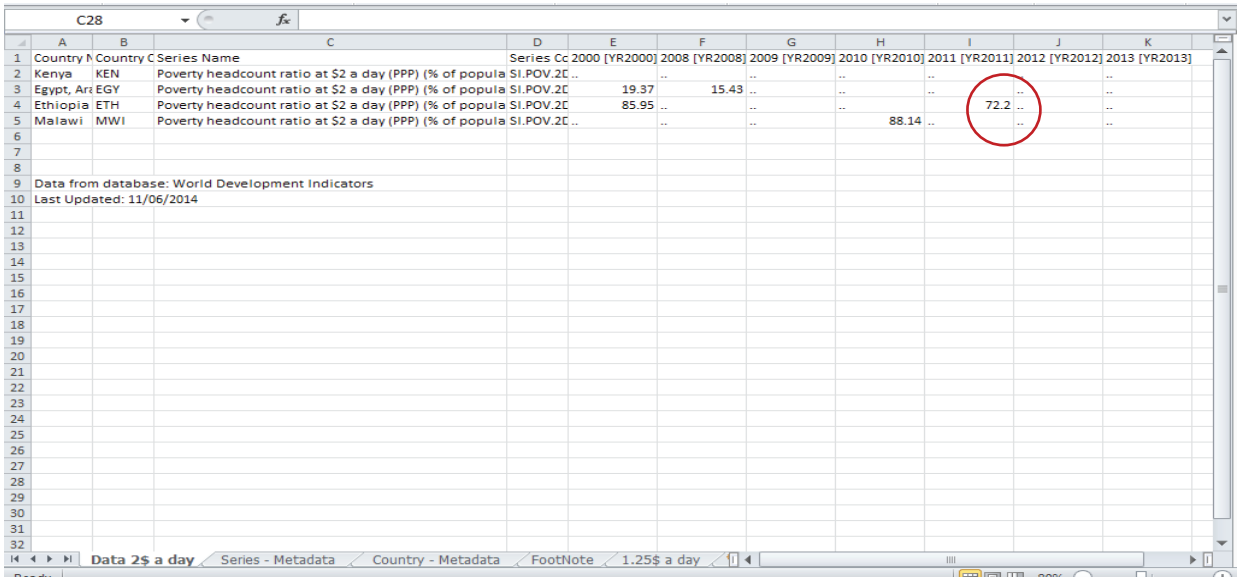
The most pressing issue for lower income countries is to create an economic system, which can liberate their populations from situations of extreme poverty. However, lower-income countries are not a homogenous group. Some countries have been more successful than others in building an economic system that disseminates wealth and economic opportunities in a manner, which effectively eradicates poverty. Therefore, it is critical to consider the poverty rate when a government is considering active intervention in an economic system, as the severity of poverty will crucially influence how pro-poor (e.g. how labour and skill intensive) a countries industrial strategy will need to be.

The first step of the "setting the stage" analysis will therefore be an examination of the national poverty headcount ratio. This will tell us the share of the population (e.g. the percentage of people) living on less than US$ 2 a day at 2005 international prices. This indicator represents a measurement of absolute poverty. This indicator has the advantage of being applicable across time and space so it makes cross-country comparisons easier. The disadvantage of this indicator is that it can be somewhat arbitrary, as the US$ 2 a day cut-off does not take into account the fact that the

amount of wealth required for basic needs fulfilment is not the same in all places at all times. There are multiple measurements of absolute poverty, but we have chosen the US$ 2 a day indicator as it represents a slightly higher standard of poverty than the US$1 or 1.25 indicators, which are also commonly used by the international community.

We can use the World Bank's World DataBank to find the National Poverty Rate for Ethiopia, Malawi, Kenya and Egypt. When we download the data for recent years, we will end up with a spreadsheet that looks something like Table 1. As we can see there are no Poverty Rate figures reported for Kenya and sporadic data for the other countries. Since we do not have consistent data for all countries, graphical representation is a bit more difficult in this case but analysts could potentially use a line or bar graph to examine relative poverty trends when data availability allows.

Table 1: National poverty rates for select countries from WDI



	A	B	C	D	E	F	G	H	I	J	K
1	Country N	Country C	Series Name	Series Cc	2000 [YR2000]	2008 [YR2008]	2009 [YR2009]	2010 [YR2010]	2011 [YR2011]	2012 [YR2012]	2013 [YR2013]
2	Kenya	KEN	Poverty headcount ratio at $2 a day (PPP) (% of popula	SI.POV.2[	..	..	..	..	..	..	..
3	Egypt, Ara	EGY	Poverty headcount ratio at $2 a day (PPP) (% of popula	SI.POV.2[	19.37	15.43	..	..	..	..	..
4	Ethiopia	ETH	Poverty headcount ratio at $2 a day (PPP) (% of popula	SI.POV.2[	85.95	..	..	..	72.2	..	..
5	Malawi	MWI	Poverty headcount ratio at $2 a day (PPP) (% of popula	SI.POV.2[	..	..	..	88.14	..	..	..
9	Data from database: World Development Indicators										
10	Last Updated: 11/06/2014										

What we see from this data is that Egypt is the best performer in terms of poverty alleviation (with a poverty rate of 15% in 2008) and that Ethiopia's national poverty rate has fallen from 86% in 2000 to 72% in 2011. The fact that nearly three quarter's of Ethiopia's population in living in absolute poverty is very concerning however, and this indicates an urgent need for a pro-poor industrialisation strategy. History has shown that no country has been able to achieve significant income generation and poverty alleviation without a structural transformation of their economy. Therefore, we will be interested in better understanding where Ethiopia stands in terms of structural change and employment composition.

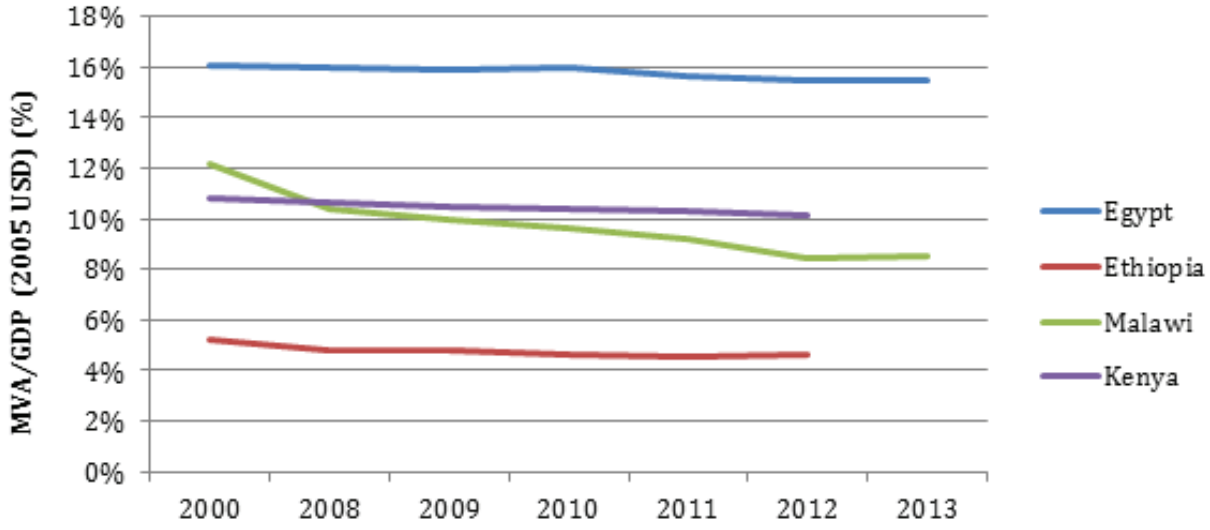
Structural Change and Employment Composition

When we speak of industrial development, the fundamental starting point is structural change. In *Tool 1: Industrial Capacity and Growth* we analyse the relative contribution of manufacturing value added (MVA) to gross domestic product (GDP) as an indicator of economic structural change. **MVA** is defined as the profits received from output minus the costs of all materials and services required for production. MVA is closely approximated by adding manufacturing wages + manufactured profits + taxes from manufacturing, which are the sources of income for workers, business owners and governments respectively.

MVA is therefore a good indicator to reflect *industrial development*. **GDP** is equal to the sum of the gross value added of all firms who produce for market transactions in a country. This indicator therefore gives us an understanding of the relative importance of the manufacturing sector

within the economy. We can graph this indicator over time to get an understanding of how rapidly countries are industrialising. For lower-income countries, we will want to see a process of rapid *industrialisation,* which would be reflected in an increasing share of MVA in GDP over time.

Figure 1: Economic structural change analysis from EQuIP Tool 1



Data source: WDI

Figure 1 shows that Ethiopia is clearly at the earliest stages of structural change, relative to comparator countries, with manufacturing accounting for only 5% of GDP from 2000-2012. We can also see from Figure 1 that none of the countries in question are *industrialising* (e.g. seeing a rising share of MVA in GDP). In looking at the raw data we can see that in absolute terms MVA has been increasing but just not as fast as other sectors. We will examine the actual MVA growth rates later when we calculate the employment elasticity of industrialisation but for now we will want to understand structural change from an employment perspective and get an understanding of how much manufacturing employment is contributing to total employment over time.

From a social perspective we will be interested in understanding how structural change is manifesting in terms of employment flows. Or in other words, *are we seeing workers moving out of agriculture and into manufacturing over time*?

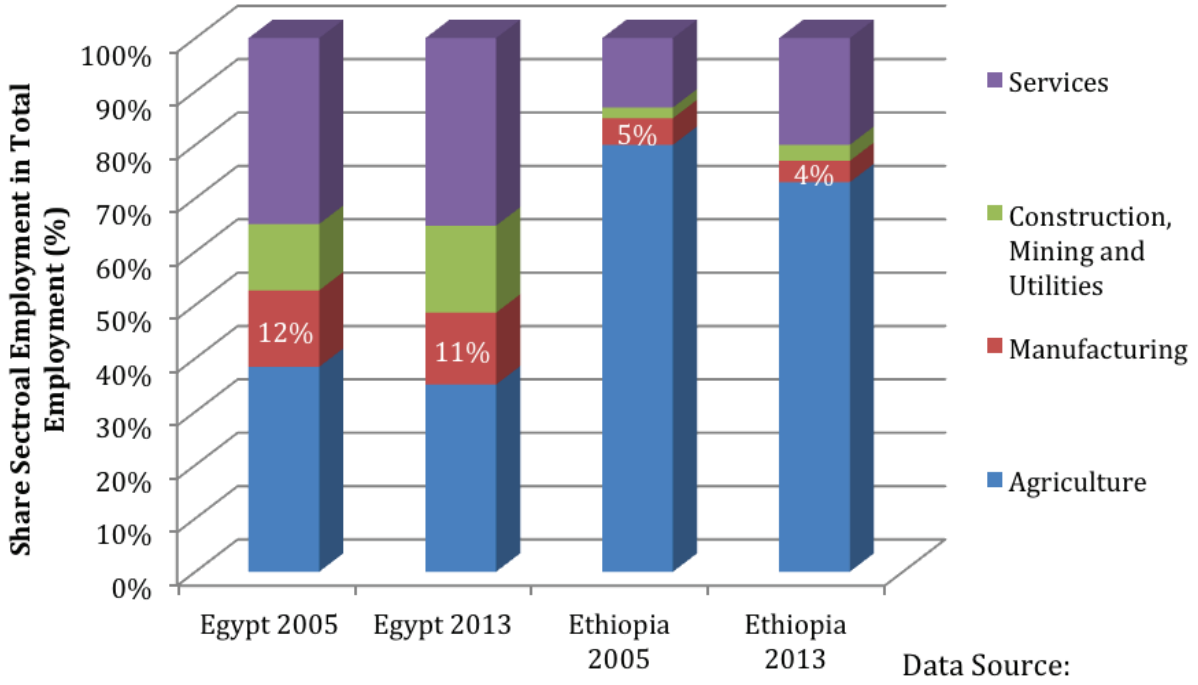
We can calculate employment structural change indicator by dividing manufacturing employment (ML) by total employment (L). We can then compare it with the shares of other economic activities in the country. According to the International Labour Organization (ILO), the "employed" comprise all persons of working age who, during a specified brief period, were in the following categories: a) paid employment or b) self-employment. Employment is disaggregated by economic activity (e.g. manufacturing, agriculture, etc.) according to the latest version of the International Standard Industrial Classification of All Economic Activities (ISIC) available for that year.

A simple method of analysing these questions is to look at the broad sectoral composition of your economy in two different years and to compare this with other countries in a stacked bar chart. In this case, ILOSTAT only has employment data disaggregated by economic activity for Ethiopia and Egypt and so we will compare the relative employment trends for these two countries.

From **Figure 2 (below)**, we can see that Ethiopia is at a very early stage of structural change compared with Egypt, with the vase majority of employment still being concentrated in agriculture. In Ethiopia, we can see a movement of people out of agriculture from 2005-2013, the relative share of employment in agriculture has declined (from 5% to 4%) and it is the services sector, which has largely been absorbing this displaced labour. Recent history has attested to the pitfalls

of a structural change process that skips manufacturing and moves straight into services (see *EQuIP Tool 1: Industrial Capacity and Growth* for a more detailed explanation of consequences). The manufacturing sector can account for up to 20% of employment in developing economies, and therefore, in the case of Ethiopia we can already see a need for industrial policies to support labour-intensive industrialisation so that the sector is able to absorb a larger share of the national labour force.

Figure 2: Employment composition 2005 and 2013



One way that we can better understand the employment generating capacity of countries industrial structures is by analysing their employment elasticity.

Employment Elasticity of Industrialisation

In our analysis thus far, we have examined the national poverty rate and structural change from an economic and employment perspective. In situations of high underemployment, productive employment generation is a core mechanism for poverty alleviation and therefore we will want to see an industrial structure that is generating high levels of employment as it expands. One way that we can analyse this process is by calculating the employment elasticity of MVA. The employment elasticity indicator is defined as the manufacturing employment growth rate (ΔML) divided by the MVA growth rate (ΔMVA). We will therefore need to first calculate the growth rates for these two variables from the information we used above.

There are many ways to calculate growth rates but across the EQuIP Toolbox we use the compound annual growth rates (CAGR). The CAGR is the year over year growth rate of, in this case, MVA and Manufacturing Employment (ML). The benefit of using the CAGR is that it helps to remove the volatility in the values to tell us the uniform rate that MVA and/or ML grew (or declined) per year.

The formula for calculating CAGR is:

$$CAGR = \left(\frac{End\ Value}{Beginning\ Value}\right)^{\left(\frac{1}{no.\ of\ years}\right)} - 1$$

By calculating the CAGR for MVA and ML, we get an understanding of how much these variables grew each year over a period of time. This number can be helpful if we want to make some quick estimates of future industrial expansion. The CAGR, represent a "smoothed" annual average and therefore is only an approximation and does not directly reflect the actual growth from one year to another, therefore, we need to take them with a pinch of salt when predicting future trends.

Analysts will ideally want to use the ILOSTAT database to determine the ML growth rates, as their employment statistics include both wage and self-employment in the manufacturing sector. However, in our case UNIDO's database (INDSTAT) has MVA and manufacturing employment data for all countries in question (e.g. Ethiopia, Malawi, Kenya and Egypt) so we will use their statistics to determine the growth rates and the employment elasticity of industrialisation. The drawback of the INDSTAT database is that their statistics are based on surveys of manufacturing firms with ten-plus employees and therefore does not reflect informal and small manufacturing activities (this issue will be discussed in more detail within our sub-sector analysis later). Moreover, they tend to have less updated statistics (relative to WDI and ILOSTAT). The most recent industrial statistics for Ethiopia are 2009, so to ensure comparability we will examine ML and MVA trends for the 2000-2009 period for all countries.

Table 2 shows the manufacturing employment and value added growth rates for Ethiopia, Kenya, Egypt and Malawi. From this table we can see that Ethiopia is performing best in terms of its manufacturing employment growth rate, but worst in terms of its MVA growth rate (even though MVA has more than doubled over the period). Having an understanding of *relative* growth rates is vital for understanding a countries industrial performance. Even though Ethiopia's MVA is growing quickly, this does not mean that competitors (e.g. Malawi or Kenya) are not industrialising *faster.*

Table 2: Manufacturing employment (ML) and MVA growth rates (CAGR)

Country	ML 2000	ML 2009	ML CAGR	MVA 2000	MVA 2009	CAGR MVA
Ethiopia	95007	148817	5.8%	466143459	971905566	9.6%
Kenya	217868	266429	2.5%	1292410289	3032313870	11.2%
Egypt	948350	1059176	1.4%	6558651190	20152740691	15.1%
Malawi	86510	41896	-8.7%	131249601	304538652	11.1%

Once we have calculated the MVA and ML growth rates we can compute the employment elasticity of industrialisation. The employment elasticity of MVA is defined as the percentage change in the number of persons employed in manufacturing resulting from a one-percentage change in MVA. Or in other words it will tell us how much new employment was generated as the manufacturing sector grew. We can calculate the employment elasticity of MVA by simply dividing the CAGR of ML by the CAGR of MVA.

A resulting employment elasticity of one (1) would mean that a 1% increase in MVA is associated with a 1% increase in Employment. An elasticity of .5 implies that a 1% increase in MVA is associated with a .5% increase in employment and so on. This number can be helpful if we want to make some quick predictions in terms of the employment effects of continued or targeted industrial expansion. However, like with the growth rates we calculated above, we must be careful when making future

predictions on the basis of elasticity's, as they can only tell us about the historical relationship between manufacturing employment and value added, and therefore cannot account for future changes, such as the introduction of more labour saving technologies in manufacturing activities.

By calculating the employment elasticity of MVA for select countries we are able to get a sense of how labour intensive the industrialisation process is in various countries. This is because if a country has an industrial structure that is largely dominated by labour-intensive sectors, agro-processing, for example, we would expect to see this reflected in higher employment elasticity. Particularly at earlier stages of development, when there is a high level of poverty, we will want to see a high employment elasticity, or *high employment generation,* as this will help stimulate a movement of people out of rural agriculture and into industrial employment which can contribute to rising living standards in the country. Calculating the employment elasticity can also tell us whether industrial expansion is resulting in a relative decline in employment, thereby indicating "*jobless growth*". From a social perspective this would be a warning sign for lower-income countries, because as discussed in the introduction, productive employment opportunities are the core mechanism through which growth contributes to poverty alleviation.

Conversely, we might see sectors with high employment growth but an overall decline in VA, indicating "*unproductive employment growth*", which means that the current employment growth trends are unlikely to be sustainable without a boost in productivity in these sub-sectors. Or alternatively we will be able to identify rapid MVA growth *and* a more moderate employment growth rate, which would indicate "*low/moderate employment generation*" in these sectors. These sectors can also be important as they can help countries to build their productive capacity so that employment opportunities correlated with rising productivity are generated.

Conceptual Device 1 was developed to help analysts quickly classify their industrial performance on the basis of their employment elasticity. From the Employment Elasticity and the MVA growth rates we can determine if a country is experiencing: 1) Jobless Growth; 2) Low/Moderate Employment Generation; 3) High Employment Generation; 4) Unproductive Employment Growth; or, 5) Declining Sector (wherein MVA and Employment are in decline)

Conceptual Device 1: Interpreting the employment elasticity of MVA

	Manufacturing Value Added (MVA) Growth	
Employment Elasticity	**Positive MVA Growth**	**Negative MVA Growth**
$\varepsilon < 0$	(-) Employment growth (+) Productivity growth **Jobless Growth**	(+) Employment growth (-) Productivity growth **Unproductive Employment Growth**
$0 \leq \varepsilon \leq .5$	(+) Employment growth (+) Productivity growth **Low/Moderate Employment Generation**	(-) Employment growth (-) Productivity growth **Declining Sector**
$.5 \leq \varepsilon \leq 1$	(+) Employment growth (+) Productivity growth **High Employment Generation**	(-) Employment growth (-) Productivity growth **Declining Sectors**
$\varepsilon > 1$	(+) Employment growth (-) Productivity growth **Unproductive Employment Growth**	(-) Employment growth (+) Productivity growth **Declining Sector**

Table adapted from Steve Kapsos (2005) "The Employment Intensity of Growth" ILO

Table 3 shows the resulting employment elasticity calculations for Ethiopia, Kenya, Egypt and Malawi as well as their classifications using **Conceptual Device 1**. We can see from this table that Ethiopia is performing best in terms of their employment elasticity and that on average a 1% increase in MVA resulted in a .6% increase in manufacturing employment per year, indicating *high employment growth* in manufacturing.

Table 3: Employment elasticity of MVA and classification

Country	ML CAGR	MVA CAGR	Employment Elasticity	Classification
Ethiopia	5.8%	9.6%	0.6	Employment-Led Growth
Kenya	2.5%	11.2%	0.2	Productivity-Led Growth
Egypt	1.4%	15.1%	0.1	Productivity-Led Growth
Malawi	-8.7%	11.1%	-0.8	Jobless Growth

It should be noted, however, that since Ethiopia is starting wish such low employment figures, the absolute amount of new employment generated might be lower than in other countries even if the employment elasticity is higher. Conversely, Malawi has seen a MVA growth occur alongside a dramatic reduction in manufacturing employment, indicating *jobless growth*. Kenya and Egypt are intermediary cases whereby their MVA growth rates are much higher than their employment growth rates, indicating that their industrialisation is being driven by rising labour productivity.

In our analysis thus far, we have placed a strong emphasis on an employment-intensive industrialisation process, as this will generate a large number of job opportunities, which is vital for poverty alleviation and rising incomes in an economy. Labour productivity is an important determinant of industrial expansion and has important implications for the employment intensity of growth so we will want to examine it in its own right.

Labour Productivity

Productivity dynamics are core to structural transformations and development in an economy. The benefits of manufacturing are largely based on the fact that it has higher productivity than other sectors in the economy, especially at the earlier stages in development. The average labour productivity of manufacturing sector can be a reflection of how "innovative" the production process is in different countries. A higher productivity will mean that a country is able to produce more manufactured goods (output) per worker, which translates into lower prices for the consumers.

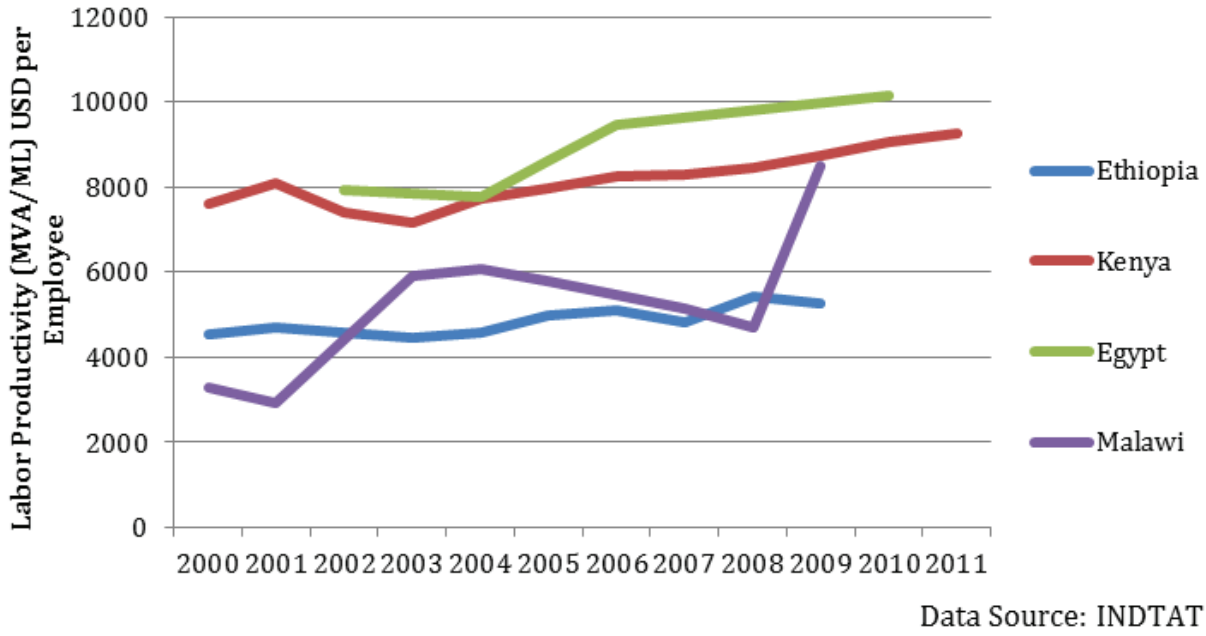
It is important to note here that the most commonly used indicator of productivity is labour productivity (e.g. as opposed to resource or capital productivity). In this context labour productivity is defined as the number of dollars (US$) of value addition generated by the average manufacturing employee. We can therefore measure productivity by dividing MVA by ML (MVA/ML).

We can see that this definition of labour productivity reverses the two variables we used to calculate employment elasticity above. This is an important observation, as an industrial structure that is dominated by labour-intensive sectors will generally show lower labour productivity than one that specialises in high-technology activities, because by definition they require more workers for production. We can therefore begin to see the important trade-offs which occur when industrial policy makers are determining which sectors to support as they will want to balance the desire for a highly productive manufacturing sector with one which is able to generate large amounts of employment opportunities for it's citizens.

For countries with high levels of poverty and underemployment, we would ideally like to see steadily growing productivity *and* high employment elasticity. This will mean that the industrial structure is generating high numbers of *productive employment* opportunities. In this situation, workers will be able to access employment opportunities, which offer rising wages (this relationship between productivity and wages will be discussed more in the next step).

We can easily calculate the labour productivity of the manufacturing sector for Ethiopia, Kenya, Egypt and Malawi using the employment and MVA data we downloaded for our employment elasticity calculations and illustrate the trends in a line graph. **Figure 3** shows the productivity dynamics occurring over the 2000-2011 period for our select countries. We can see from **Figure 3 (below)** that labour productivity increased most markedly in Malawi during this period, whereas Ethiopia's labour productivity rose more gradually and was significantly lower than other countries by 2009. This analysis therefore helps us to better understand the important trade-offs that exist between rapid labour productivity gains and rapid employment generation. We saw earlier that Malawi was experiencing Jobless Growth within their manufacturing sector, which we now know is a result of a dramatic increase in labour productivity during this time. Conversely, Ethiopia's high employment elasticity is likely a result of a lower and more gradual increase in labour productivity.

Figure 3: Labour productivity 2000-2011 for select countries



Analysts may also be interested in calculating the labour productivity growth rates. They can once again use the Compound Annual Growth Rate (CAGR) equation to determine the growth rate from 2000-2009.

From **Table 4**, we can see that although Ethiopia's overall labour productivity level is lower than comparator countries that it is growing at about the same rate as Kenya and Egypt, which is a positive sign of *productive employment* generation in the manufacturing sector.

Table 4: Labour productivity growth rate (2000-2009)

Country	Labour Productivity 2000	Labour Productivity 2009	Labour Productivity CAGR
Ethiopia	4525.306634	5266.068117	2%
Kenya	7611.765808	8743.797498	2%
Egypt	7943.037631	10159.89213	3%
Malawi	3297.317794	8496.618805	13%

From a social perspective, the reason that we want to see the generation of *productive employment* opportunities is because the rising labour productivity should translate into rising wages for workers. However, this association is not always automatic and so we will want to examine the wage trends in the manufacturing sector.

Wage Intensity of Industrialisation

One of the core benefits of enhanced productivity in the manufacturing sector is that is *should* translate into higher wages for employees, which then directly contribute to rising incomes in the economy. Throughout the EQuIP toolbox we have emphasised the unique role of the manufacturing sector to promote direct and indirect productivity increases in an economy. As countries industrialise, their productive capacity increases which results in employment opportunities with rising real wages and earnings. The international community is increasingly emphasising the importance of "wage-led" growth as a core engine of development due to its direct and indirect economic effects.

As wages increase, workers incomes rise, directly contributing to rising standards of living. Rising

wages also have very important *indirect effects*. Rising incomes result in increased demand for local goods and services, which then stimulates the growth and expansion of new business activities (e.g. effective demand). Evidence indicates that demand in most economies is driven by domestic wage increases, not rising profits[1]. At earlier stages of development, these demand effects provide the necessary "push" required for structural transformation and diversification (e.g. a movement out of subsistence agriculture and informal services). Rising wages for the poor will first result in rising demand for agricultural products and other basic necessities (which will contribute to rural poverty alleviation and rural-urban migration) then as wages continue to rise there will be increased domestic demand for manufactured goods, which further stimulates industrialisation. However, contemporary history has seen the suppression of these wage effects in many countries. We will therefore want to ensure that the benefits of industrialisation are being shared with workers and that productivity increases are translating into rising wages.

In our earlier discussion of manufacturing value added (MVA) we saw that it can be approximated by adding manufacturing wages + profits + taxes. We can therefore evaluate how much of the industrial "pie" is going to workers by looking at the wage intensity of industrialisation. The wage intensity of industrialisation can be calculated by looking at the share of the wage bill in MVA. The manufacturing wage bill is defined as the total amount of money paid by manufacturing firms to their employees (in the form of wages and salaries). The Wage Bill can be downloaded from INDSTAT and we can use the MVA data from our earlier employment analysis to calculate the wage intensity of industrialisation. It is important to once again note, that INDSTAT wage data is only for firms with more than ten employees and does not include incomes earned from self-employment in the manufacturing sector and is therefore only an approximation[2].

From the perspective of "wage-led" growth, we will want to see a high share of MVA going to wages as this can help stimulate consumer demand within the economy. If we see a constant or rising wage intensity, this means that workers are benefiting from industrialisation via higher wages and/or more employment. Conversely, if we see declining wage intensity this reflects a widening gap between productivity and wage trends. A declining share of wages in MVA would also indicate that wage and/or employment generation in the *formal sector* is not keeping pace with the growth of the manufacturing sector. At a macro-economic level, labour's share (wages, salaries and benefits) in GDP is generally between 40% and 60% and therefore we would expect to see a similar range within the manufacturing sector.

1 http://www.ilo.org/public/libdoc/ilo/2012/112B09_325_engl.pdf

2 In lower-income countries, a huge section of the population will not be wage earners (they will be self-employed). If analysts use the MVA data from WDI or national accounts, then the wage analysis will not always be comparable with the productivity analysis (which we approximate as MVA/Employee) as the MVA data would include informal and self-employed enterprises and workers which is not reflected in the wage data. INDSTAT determined MVA and Wage Bill values from an Industrial Survey and therefore we can make the comparison with an understanding the informal only covers a sample of firms in the country.

Figure 4: Relative wage intensity of industrialisation 2000-2010

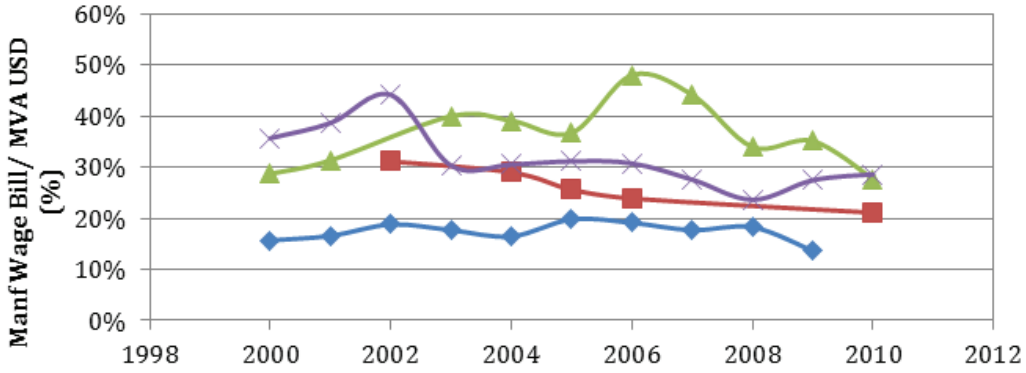


Figure 4 shows the wage intensity of industrialisation for Ethiopia, Egypt, Malawi and Kenya. We can see from this graph that Ethiopia has the lowest wage intensity, with the wage bill only accounting for about 15% of MVA in 2009 but it has remained the most constant over time. In all cases, we are seeing a decline in the wage intensity of industrialisation over time, indicating that wages are not keeping pace with productivity and/or low employment elasticity.

In order to check the relationship between productivity and wage trends we will need to calculate the wage growth rate using the CAGR equation presented above. As INDSTAT data provides data on all wage and salary expenditures in the manufacturing sector we will need to divide the wage bill by the total number of employees to determine the average annual wage of manufacturing workers in the country. It is important to note that this average will mask wage inequalities within the manufacturing sector. As the Wage Bill includes both wages and salaries it will reflect both managers and shop floor workers labour earnings. In situations where factory managers are paid exponentially more than assembly workers, for example, we could see a much higher average wage than what is actually received by the average manufacturing worker.

When we compute the wage growth rate we can compare it with the productivity growth rate for the same period. **Table 5** shows these calculations for our example countries. In all instances wage growth rates are keeping pace with or exceeding productivity growth rates. The case of Malawi, this nation stands as a particularly striking example of rapid wage gains, but we know from our employment elasticity analysis that they are experiencing "jobless growth" in their manufacturing sector. This example illustrates the important trade-offs that can exist between rapid wage gains and widespread employment generation.

Table 5: Wage and productivity growth rates 2000-2009

Country	Wage Growth Rate	Productivity Growth Rate
Ethiopia	2%	2%
Kenya	5%	2%
Egypt	8%	3%
Malawi	25%	13%

It is important for industrial policy makers to consider the potential trade-off between an employment intensive and wage-intensive industrialisation trajectory in the short-term. Rapid productivity gains can minimise the inclusiveness of industrial development by reducing the number of employment opportunities available. However, when we speak of industrial policies they are not usually directed towards the manufacturing sector as a whole, but rather targeted at specific economic activities that have been identified as being promising or socially beneficial. Therefore, we will want to conduct a more in-depth analysis of Ethiopia's manufacturing sector to better understand which activities are contributing most to productive employment generation and poverty reduction.

Main Objectives of "Setting the Stage" Analysis

The purpose of the "Setting the Stage Analysis" is to look at overall industrial performance from a social perspective. An understanding of a countries relative poverty rate and level of structural transformation can help government officials to consider what type of industrialisation trajectory is most desirable *and* feasible considering the country's socio-economic situation. This analysis also functions to illustrate the potential trade-offs between a labour-intensive industrialisation trajectory and one that is driven by rapid productivity gains, so that analysts consider these dynamics within their short-term and longer-term industrial policy objectives

3. Sub-sector Employment Analysis

From the "Setting the Stage" analysis we are able to identify some broad social trends occurring within the manufacturing sector, but we still do not know about the industrial structure and which activities are driving these trends. We can therefore learn a lot about the current performance of industry by examining employment and wage trends at the sub-sector level (e.g. textiles, chemicals, agro-processing, etc.) With a better understanding of social performance at the sub-sector level, industrial policy makers will be in a stronger position to develop interventions to reverse negative trends or enhance positive ones.

We will first examine the employment composition of the manufacturing sector to better understand if there are particular activities currently dominating industrial employment, thus disproportionately influencing the trends we identified in the "Setting the Stage" analysis. We can then use the employment elasticity indicator to determine which activities are contributing most to new employment generation as they expand. With just two indicators we will be able to better understand the employment performance of different manufacturing activities.

In this analysis we can use UNIDO's INDSTAT database to assess the employment performance of *formal* firms, but when possible we will also want to compliment this with information on *informal* manufacturing employment. The benefit of using INDSTAT data, as opposed to national statistics for example, is that it allows for international comparisons and the benchmarking of performance. The drawback of using this database is that the employment figures are based on estimates from industrial surveys of firms with more than ten employees. In many developing countries however, manufacturing activities are undertaken by informal enterprises.

Throughout the 20th century formalised work arrangements were the accepted model of industrial relations. Indeed, most high-income countries enacted laws that formalised the terms and conditions of industrial labour, which resulted in better and more dignified jobs. This formalisation process began to be taken for granted as an inevitable outcome of industrial expansion. However, the truth is that as structural change occurred in low-income countries only a small fraction of those moving out of subsistence farming were absorbed into formal working arrangements. Indeed, the last several decades presented a movement in the opposite direction, with increasing sub-contractualisation, loss of regular jobs and fixed wage payments, a lengthening of working hours and the withdrawal of labour laws. In low-income countries, the vast majority of firms are micro or small in size, and the informal economy often accounts for 80% or 90% of total manufacturing employment. Moreover, the emphasis placed on deregulation and a "flexible" labour force by organisations such as the World Bank and IMF has meant that, in nearly all developing countries, there is an increasing emphasis on sub-contracting arrangements whereby large firms utilise home-based or small informal firms for many of their manufacturing activities.

Informal statistics can be difficult to obtain but they are very important to consider when evaluating the social performance of industry as the world has been seeing a rising share of manufacturing activities being taken up by informal enterprises and by casual workers. In this example, we will use Ethiopia's national statistics on informal manufacturing enterprises to complement the formal sector statistics so that we have a more holistic understanding of the social dynamics at play within the manufacturing sector.

Methodology

1) Manufacturing Employment Composition

Strategic Questions

How is manufacturing employment distributed across sub-sectors?

How is this composition changing over time?

How volatile is the employment in each sub-sector?

Data and sources for computing manufacturing employment composition

Indicator	Variable	Source
Manufacturing Employment Composition	Sub-Sector Employment	INDSTAT
	Manufacturing Employment	INDSTAT

Illustrative Method

Line Chart and Stacked Area Chart

2) Employment Elasticity of Manufacturing Sub-sectors

Strategic Questions

How much new employment is each sub-sector generating as it expands?

How efficiently are sub-sectors generating new employment?

Data and sources for computing employment elasticity of manufacturing sub-sectors

Indicator	Variable	Source
Employment Elasticity	Sub-sector Employment Growth Rate	INDSTAT
	Sub-sector Value Added (VA) Growth Rate	INDSTAT

Illustrative Method

Use Conceptual Device 1 (see "Setting the Stage" Employment Elasticity of MVA Analysis) to classify sub-sectors according to their employment elasticity.

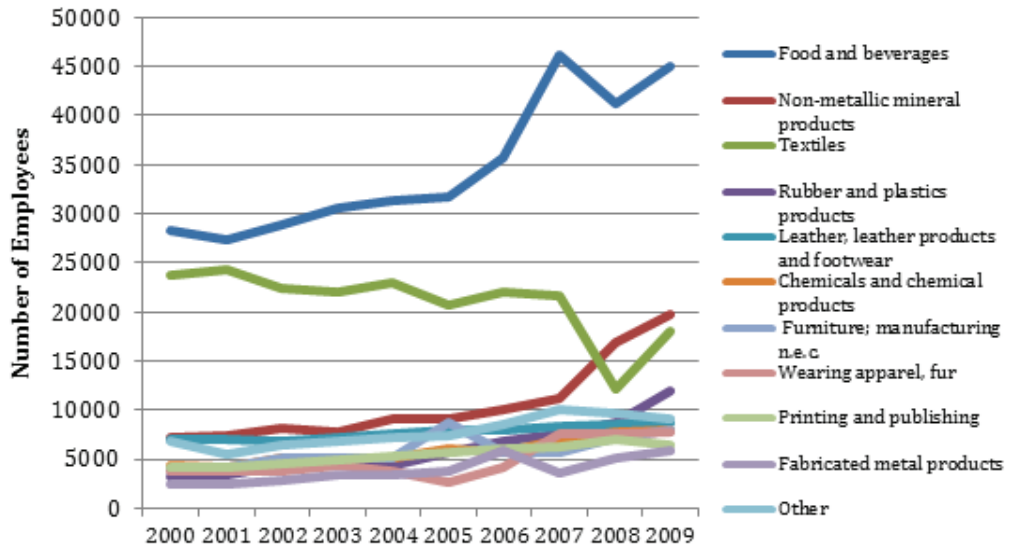
Analysis and Interpretation of Findings

Manufacturing Sub-sector Employment Trends (Formal)

In the same way that we analysed the employment composition of the entire economy, we can analyse the employment composition of the manufacturing sector to better understand if particular industries are dominating in terms of employment and how well distributed employment is across sub-sectors. We can analyse the employment composition of manufacturing by downloading sub-sector employment rates and graphing them within a line graph and 100% stacked area chart.

Figure 5 presents a line graph of Ethiopia's manufacturing sub-sector employment trends in each sector from 2000 to 2009. This graph shows that the textile sector has been shedding the most labour over this period of time and that the main generators of employment have been the food and beverages, textiles and non-metallic mineral sub-sectors. The graph also illustrates the volatility of employment in each sector, with the food and beverage and textile sub-sectors experiencing a large shock in 2007, likely due to the global economic crisis and a high export orientation in these sectors (see *Untapped Domestic Potential Tool* for more information on how to enhance industrial resiliency).

Figure 5: Manufacturing sub-sector employment trends Ethiopia 2000-2010

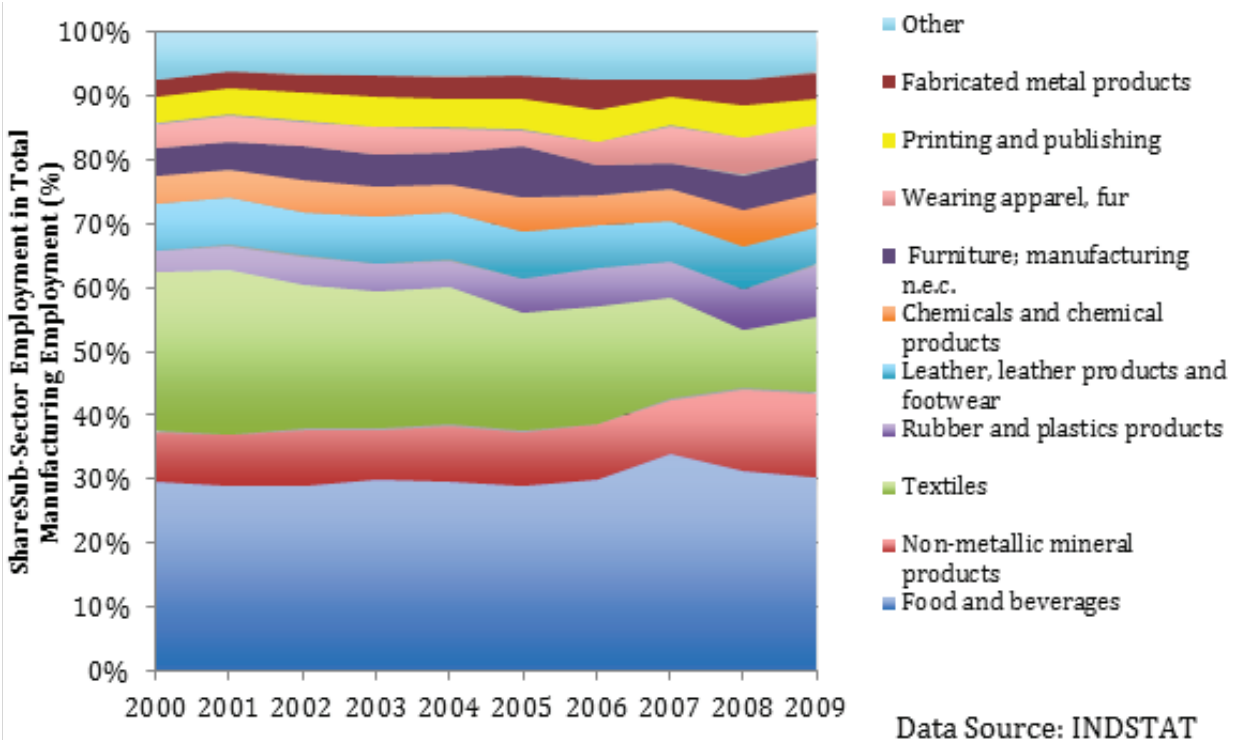


Data Source: INDSTAT

Manufacturing Employment Composition (Formal)

In addition to understanding the absolute level of employment in each sub-sector over time, we will also want to understand how these trends have affected the overall composition of industrial employment. We can analyse the employment structure of the manufacturing sector by illustrating sub-sectoral employment data in a 100% stacked area chart. From this analysis we can identify whether manufacturing employment is concentrated in particular activities and how this composition has been changing over time. A more diversified employment structure is likely to be more resilient to shocks, and therefore can be desirable as employment will not be dependent on only one or two activities (See *EQuIP Tool 4: Diversification- Domestic and Export Dimensions* for more information on the relative benefits of a more diversified industrial structure). We can also better understand how the structure of employment is changing within the manufacturing sector over time and whether particular activities are gaining in terms of employment share over time.

Figure 6: Manufacturing sub-sector employment composition Ethiopia 2000-2010



Data source: INDSTAT

From **Figure 6** we can see that the composition of employment in Ethiopia's manufacturing sector has remained more or less constant from 2000-2009, apart from a marked decline in employment in the textile industry and a substantial increase in non-metallic mineral production. Moreover, we can see that over 50% of employment is accounted for by the food and beverages, textiles and non-metallic mineral sub-industries. The high share of employment accounted for by these three sub-sectors will naturally make us more sensitive to other economic and social dynamics occurring within them, as they will affect the most workers. We will want to also consider the importance of building and expanding production in more nascent activities as this will help to diversify the industrial employment structure.

Manufacturing Sub-sector Employment Trends (Informal)

As discussed within the introduction to this section, one of the limitations of the INDSTAT data we analysed thus far is that it is based upon an examination of formal manufacturing firms with ten or more employees[3]. We will therefore want to compliment this analysis, when possible, with additional data on the micro, small and/or informal manufacturing sector.

There is no single definition of "informal employment". Some definitions focus on the legal status of the employment, with informality manifesting as unreported employment. This form of employment is not taxed or regulated by the government. Alternative definitions focus on the security of employment, with formal employment being characterised by social benefits, regular salaried employment and job security. In low-income countries the differentiation may be particularly arbitrary, as the regulatory and social security structures will render most of employment "informal" on the basis of these definitions.

In the case of Ethiopia, they define the informal sector on the basis of firm size and registration

3 INDSTAT only reports survey results from firms with more than ten employees.

status[4]. The Ethiopian national statistics agency conducts two manufacturing surveys, one for medium and large firms and one for the small scale manufacturing industries (which they define as firms with less than ten employees). We can therefore use the data from the latter survey, the Small Scale Manufacturing Industries Survey, to compliment our earlier analysis and learn more about the role and shape of small scale manufacturing in the economy. It is important to note that the information from this survey will only tell us about employment within informal firms, not about casual employment (see box above concerning casualisation rates).

The Small Scale Manufacturing Industries Survey reveals that in Ethiopia, there were 43,338 informal manufacturing firms as compared to 2,172 formal firms in 2007. These small firms employed over 138,951 people and generated a value added of 118,930,851 (compared to the 134,963 jobs and 653,067,049 MVA generated by larger firms). The fact that there are just as many people employed in informal manufacturing enterprises as there are in the formal manufacturing sector illustrates the importance of examining informal dynamics in order to get a complete picture of the social implications of industrial development.

Manufacturing Employment Composition (Informal)

In the ideal scenario, we would be able to do the exact same analysis as the one done for the formal sector, however due to the unregistered nature of informal firms, time series can be hard to obtain. In the case of Ethiopia, we use two national surveys from 2001/2 and 2007/8 to get a broad idea of the dynamics occurring in manufacturing firms with less than ten people over this period of time.

The first step will once again be to examine the relative shares of employment for each sub-sector and may be illustrated in two simple pie charts for the two years. **Figure 7** shows a great deal of structural change occurring within the informal manufacturing sector. There has been a substantial move of people out of Grain Milling (which accounted for 88% of informal industrial employment in 2001/2 and then only 57% in 2007) and into activities such as furniture and fabricated metals which now account for 24% and 9% of employment respectively.

Figure 7: Informal manufacturing employment composition Ethiopia (2001/2 and 2007/8)

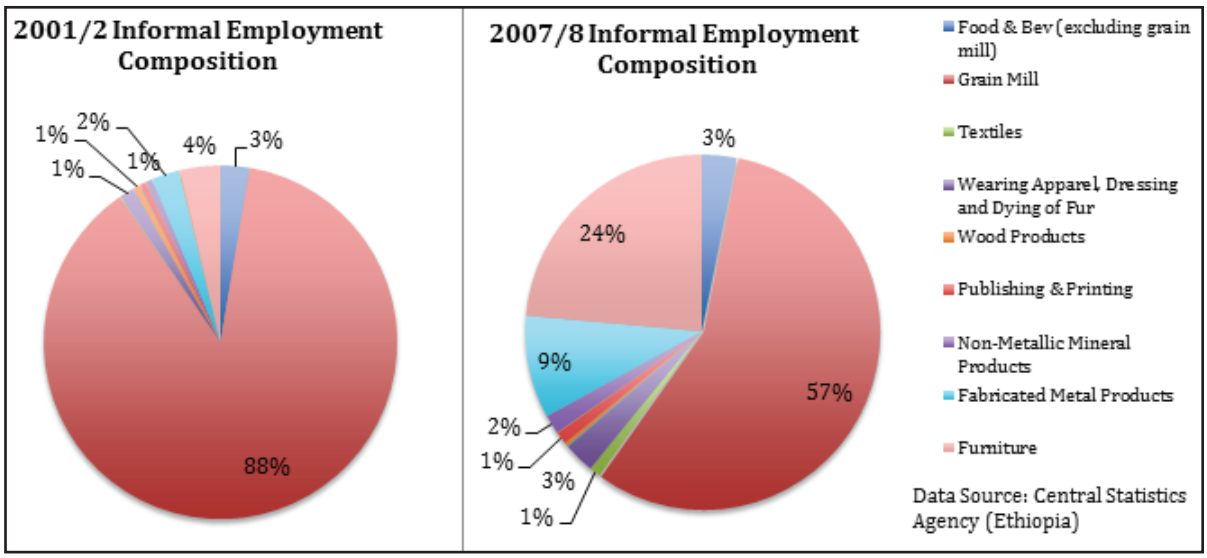


Figure 7 also shows a diversification of the informal industrial structure (*see Tool 4: Diversification*

4 In Ethiopia, the informal sector is defined as household type establishments/activities which: 1) are mainly engaged in marketed production, 2) are not registered companies or cooperatives 3) have no full written book of accounts 4) have less than ten persons engaged in the activity and 5) have no license

Tool for more information). This could indicate that large formal firms are increasingly sub-contracting parts of their manufacturing activities to the informal sector, which can have negative effects on the absorptive capacity and quality of formal employment. We will therefore, need to do a more in depth analysis to better understand these informal trends and how they relate to formal sector employment dynamics.

Sub-Sector Employment Elasticity (Formal and Informal)

The employment figures above give us an understanding of which sectors were growing or declining in terms of employment, but we don't yet have an understanding of how these trends relate to value added (VA) growth of these sub-sectors. We can use the employment elasticity indicator from the "Setting the Stage" analysis to assess how efficiently manufacturing sub-sectors are generating new employment. The employment elasticity will also help us to assess how interventions to promote the economic growth and development of specific industrial activities will, or will not, contribute to employment objectives.

The employment elasticity of value added will help us estimate how much additional employment is generated for every percentage increase in VA. In order to calculate the employment elasticity we need to divide the CAGR of sub-sctor employment by the CAGR of sub-sector value added[5] (for more information on calculating the employment elasticity see "Setting the Stage" Analysis above).

Sub-Sector employment elasticity figures can be incredibly useful for industrial policy makers when trying to estimate the employment effects of industrial expansion. Imagining, for example, that a Minister of Industry has set a target of expanding textile production by 20% over the next five years and an employment elasticity of .5 is found, we can expect about a 10% increase in employment over the same period (*if* production techniques remain more or less the same). Therefore, we will want to make sure to develop a table that includes these numbers. We can also use **Conceptual Device 1** to classify each sub-sector on the basis of their employment generation capacity (See "Setting the Stage" Analysis).

Depending on each national context, policy makers may be more interested in developing interventions to revive dying sub-sectors or they may be interested in promoting sub-sectors, which are generating a large amount of employment so as to catalyse on these positive effects. This tool does not imply a hierarchy of importance amongst these different trends but simply helps to identify the main employment and productivity dynamics occurring in each manufacturing activity.

5 It is important to note that for the case of Ethiopia we are computing average annual growth rates on the basis of levels in 2000 and 2009. Since 2009 was in the aftermath of the global financial crisis, the average growth rates that we compute may be lower than if we had more up to date information.

Table 6: Sub-sector formal employment elasticity analysis for Ethiopia 2000-2009

Manufacturing Sub-Sector	Employment CAGR	VA CAGR	Employment Elasticity	Sector Classifications
Food and beverages	5%	6%	0.88	High Employment Generation
Tobacco products	3%	7%	0.44	Moderate Employment Generation
Textiles	-3%	5%	-0.60	Jobless Growth
Wearing apparel, fur	8%	7%	1.21	Unproductive Employment Growth
Leather, leather products and footwear	3%	2%	1.26	Unproductive Employment Growth
Wood products (excl. furniture)	7%	5%	1.45	Unproductive Employment Growth
Paper and paper products	4%	13%	0.31	Moderate Employment Generation
Printing and publishing	5%	9%	0.54	High Employment Generation
Chemicals and chemical products	7%	15%	0.48	Moderate Employment Generation
Rubber and plastics products	16%	12%	1.33	Unproductive Employment Growth
Non-metallic mineral products	12%	16%	0.74	High Employment Generation
Basic metals	4%	15%	0.29	Moderate Employment Generation
Fabricated metal products	10%	25%	0.40	Moderate Employment Generation
Machinery and equipment n.e.c.	-5%	10%	-0.49	Jobless Growth
Electrical machinery and apparatus	9%	-8%	-1.16	Unproductive Employment Growth
Motor vehicles, trailers, semi-trailers	-1%	-10%	0.12	Declining Sector
Furniture; manufacturing n.e.c.	8%	12%	0.67	High Employment Generation
Total manufacturing	5%	9%	0.57	High Employment Generation

Data Source: INDSTAT

Table 6 illustrates Ethiopia's formal employment growth rates, VA growth rates, employment elasticity's and sub-sectoral classifications on the basis of ***Conceptual Device 1***. From this table what we can identify is that the textile's dramatic shed of employment has corresponded with a rapid increase in VA, which means that they are experiencing "jobless growth", which is worrying since this sector still accounts for a high percentage of overall employment (14% as of 2009). On the other hand, we would be pleased to see that the two largest generators of new employment in the economy, the food/beverage and non-metallic mineral sub-sectors are both growing in terms of VA, thereby indicating "employment-led growth". The high employment elasticity's in these sub-sectors means that as they grow they will increasingly absorb workers into activities with rising productivity. Apart from an analysis of these employment intensive sub-sectors we can also see some other important trends arising, such as a high number of sub-sectors which are experiencing "unproductive employment growth". It is likely that the employment generated in these sub-sectors will not be sustainable in the long-term unless productivity is enhanced (see EQuIP Tool 3: Industrial and Export Upgrading for tools and strategies to upgrade manufacturing activities).

The relatively slow growth of productivity was illustrated within our "Setting the Stage" analysis and therefore we can already see the importance of targeted sub-sector interventions to upgrade activities in order to boost overall productivity levels (See *EQuIP Tool 3* for methodologies and strategies to promote sectoral upgrading).

We can use the same methodology as above to determine how employment generation relates to VA trends in *informal* manufacturing activities by calculating the employment elasticity of each informal sub-sector and then classifying them using **Conceptual Tool 1**. From these calculations we can develop a table that is similar to the formal sector analysis so we can compare trends. It is important to note that in many cases the sub-sector classifications for the informal sector will be different from the formal sector. In such cases, a direct comparison of trends will not be possible but we can still get a general overview of how formal and informal industrial dynamics are relating to one another.

Table 7: Sub-sector informal employment elasticity analysis for Ethiopia 2001/2-2007/8

Manufacturing Sub-Sector	Employment CAGR	VA CAGR	Employment Elasticity	Classification
Food & Bev (Excluding Grain Mill)	7%	16%	0.42	Productivity-Led Growth
Grain Mill	-4%	3%	-1.46	Jobless Growth
Textiles	56%	59%	0.95	Employment-Led Growth
Wearing Apparel, Dressing and Dying of Fur	18%	35%	0.51	Employment-Led Growth
Luggage, Handbags and Footwear	17%	45%	0.37	Productivity-Led Growth
Wood Products	-9%	4%	-2.35	Jobless Growth
Paper Products	-17%	-40%	0.44	Declining Sector
Publishing & Printing	17%	2%	9.19	Employment-Led Growth
Chemicals and Chemical Products	23%	-7%	-3.49	Unproductive Employment Growth
Non-Metallic Mineral Products	22%	53%	0.43	Productivity-Led Growth
Fabricated Metal Products	29%	31%	0.92	Employment-Led Growth
Furniture	41%	52%	0.78	Employment-Led Growth
Total	3%	14%	0.25	Productivity-Led Growth

Source: Central Statistics Agency of Ethiopia (small-scale manufacturing industries)

Table 7 shows that in general there have been very high employment and value added growth in the informal sector. In the case of Ethiopia, when we compare formal and informal trends we can see that the formal textile industry was experiencing "jobless growth" while the informal sector experienced "employment-led growth". This could indicate that textile firms are increasingly sub-contracting their work to the informal sector. Conversely, we are seeing the decline of the informal "paper products" sub-sector alongside a growth in the formal sector, which could indicate that this sector is "formalising". We will ideally want to see the growth and expansion of the formal sector and the progressive absorption of informal enterprises and workers.

From a poverty alleviation perspective, it can be positive to see rising productivity in the informal sector as this can translate into employment opportunities with rising wages. However, a growing informal sector can also have negative impacts on the wages of formal sector workers as their bargaining power can be undermined by the availability of cheaper, informal labour. Our next

step will be a wage analysis of the formal and informal manufacturing sub-sectors so that we can better understand the relative social dynamics at play. The sub-sector employment calculations enable the analyst to better understand the overall employment situation within manufacturing, but we do not know how these trends are affecting the incomes of workers. For example, is the "jobless growth" in the textile sector resulting in higher wages for the remaining employees? Is the unproductive employment generation in some sub-sectors being reflected in lower wages for workers? In order to answer these questions, we must move to a sub-sector analysis of wages.

Main Objectives of a Sub-sector Employment Analysis

This sub-sector employment analysis allows us to understand, which sub-sectors are currently dominating in terms of employment and how much new employment each sub-sector is generating as it expands (in terms of VA). Since this toolkit was developed with low-income countries in mind, we are necessarily interested in promoting sub-sectors that will contribute to poverty alleviation through productive employment generation. In such situations, the analysis focuses on promoting both growth *and* employment. Therefore, it helps analysts to identify sub-sectors where VA is expanding, productivity is growing *and* employment is being generated, as well as the sub-sectors where "jobless growth" is occurring. A solid understanding of these trends will, therefore, help industrial policy makers to better identify "win-win" scenarios between their economic and social objectives in the industrial sector as well as potential "trade-offs", which would require complementary policies or some tough decisions.

4. Sub-Sector Wage Analyses

Methodology

1) Sub-Sector Average Wages

Strategic Questions

How rapidly are wage rates growing over time?

How does the income rendered from manufacturing activities compare to the minimum wage/ average national income?

Data and sources for computing sub-sectoral average wage

Indicator	Variable	Source
Average Sub-sector Wage	Sub-sector Wage Bill	INDSTAT
	Sub-sector Employment	INDSTAT

Illustrative Method

Use line graph to show trends and wage performance of each sub-sector relative to minimum wage or GDP/Capita

2) Sub-sector Wage Elasticity of Productivity

Strategic Questions

How much are productivity gains benefiting workers in the form of wage increases?

Are there sectors where wages are being artificially suppressed?

Data and sources for computing wage elasticity of productivity

Indicator	Variable	Source
Wage Elasticity of Productivity	Wage Bill Growth Rate (%)	INDSTAT
	Productivity Growth Rate (%)	INDSTAT

Note: Productivity is estimated as VA/MNF Employment

Illustrative Method

Use **Conceptual Device 2** to classify sectors

Analysis and Interpretation of Findings

Sub-sector Wage Bill (Formal and Informal)

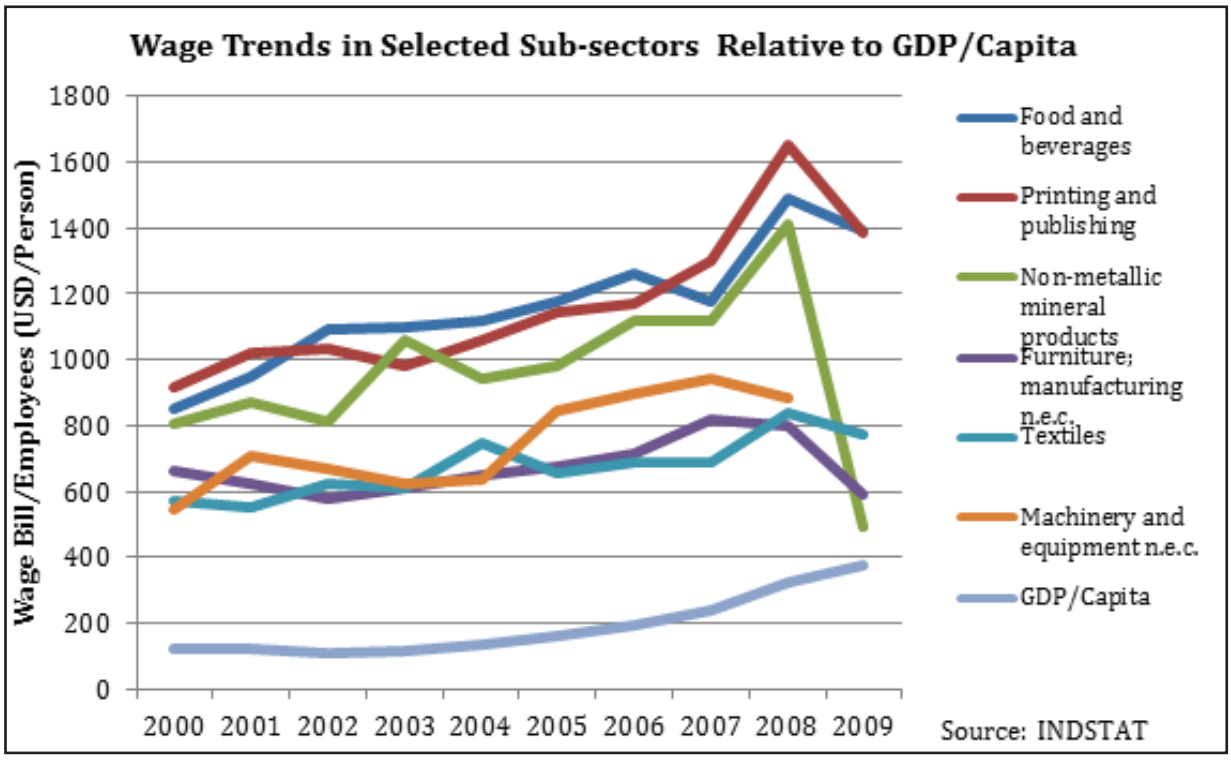
With a solid understanding of the employment dynamics within the manufacturing sector we will examine their corresponding wage dynamics, as the income generated from industrial development is an important determinant of rising standards of living for a population. *Are there sub-sectors with rapidly rising wages? Are the wage rates volatile or stable? Are the wages earned in each sub-sector high enough to provide for basic needs for the workers and their families?*

These types of questions can once again be answered though simply graphing wages over time. However, we will want some kind of baseline wage rate by which to compare the sub-sectoral trends. A potential baseline indicator is the national minimum wage rate as these are generally computed on the basis of the wage required to meet all basic needs in an economy, however in the event that a country does not have a minimum wage (as is the case in Ethiopia) GDP per capita may be used. GDP per capita is a measure of average income per person in a country but the limitation is that is only measures output in market transactions and cannot account for how wealth is distributed within a country.

In order to make the graph more reader friendly analyst may choose which sectors they want to focus on. In **Figure 8** we chose to graph sectors that we identified in the proceeding analysis as experiencing "employment-led growth", some of the sectors that we identified as experiencing "unproductive employment generation" and the textile sector (due to its large share of employment).

Figure 8 shows an overall increase in wage rates in all sectors (even those experiencing "unproductive employment generation") but a marked drop in rates in 2008, likely due to the global economic crisis and pressure put on firms to reduce costs (see *Untapped Domestic Potential Tool* and *EQuIP Tool 8: GVC's*) for more information on reducing export dependence).

Figure 8: Manufacturing sub-sector wage trends Ethiopia 2000-2010



The high level and rapid growth in wages in the food and beverage sub-sector is a particularly

good phenomena because as we know from the first analysis, approximately one third of all manufacturing employment is in this sector; it has been experiencing rapid employment generation with an employment elasticity of .88, a significant upward trend. Moreover, all of these sectors are seeing wage rates that are much higher than the average income (e.g. GDP/Capita). Conversely, in the textile sector we can identify a slow rise in wages despite having identified rapid increases in VA and a decline in employment. The furniture sector also stands as a problematic sub-sector; the wage rates have been declining since 2007, reaching a wage rate below that of 2000 in 2009.

We can do a similar analysis for the informal sector, comparing sub-sectoral wage rates in 2001/2 and 2007/8. Since we are only comparing two years we can graph the wage trends in a bar graph and compare them with GDP/capita.

Figure 9: Manufacturing sub-sector informal average wages for Ethiopia, 2001/2 and 2007/8

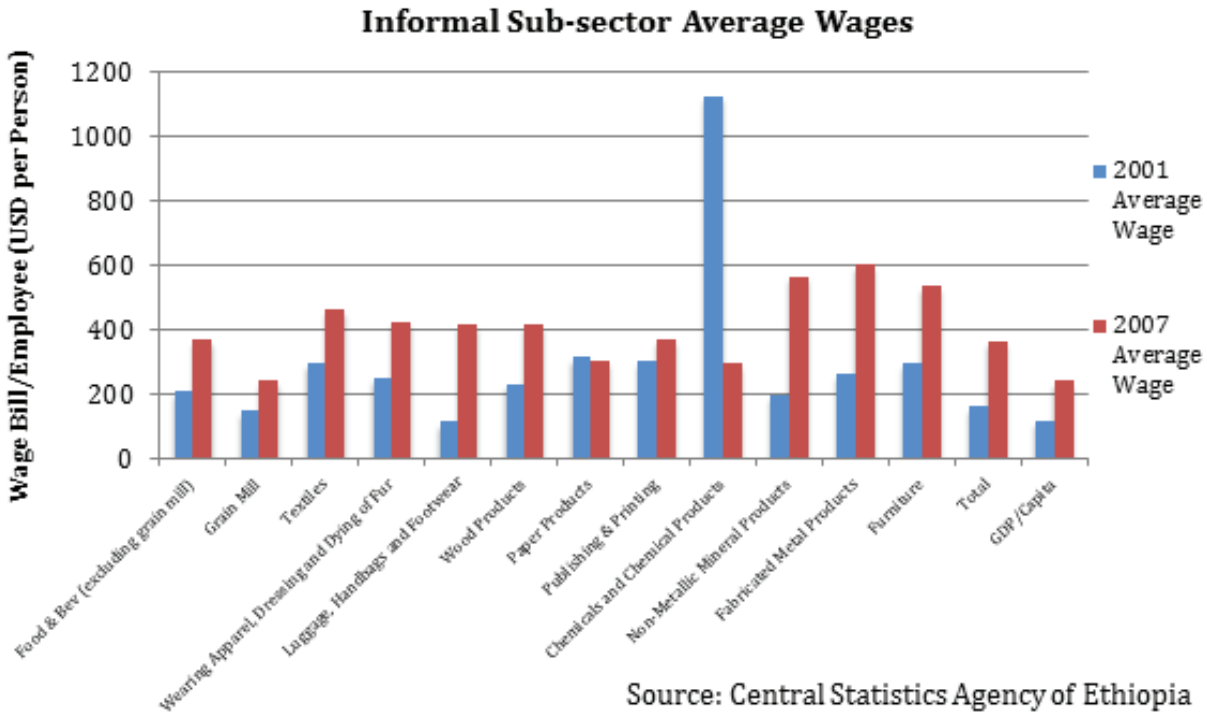


Figure 9 shows an increase in wages over time in informal manufacturing activities, with some activities performing better than others in terms of their wage generation. In the case of the grain mill sector, for example, the wage rate is close to that of GDP/capita and, therefore, the relative decline of employment in this this sector and relative increase of higher wage sectors (e.g. fabricated metals and furniture sectors) can be viewed as a positive sign of structural change. However, while average informal wages are higher than average income (GDP/capita) when comparing these rates with the formal sector a stark difference appears. In the formal sector we did not see any wage rates below US$ 600 per employee, while in the informal sector we do not see any above US$ 600 per employee (except for the chemicals sector in 2001). In textiles, for example, we can see that workers earn on average about US$ 465 per year in the informal sector vs. US$ 775 per year in the formal sector. We will therefore be concerned by the declining formal employment in the textiles industry as workers are now earning significantly less as employment in the informal sector grows.

Highly Recommended Additional Indicator: Wage Differentials

One of the main limitations of the wage data we have used for this analysis is the fact that it is based on *averages*. However, in many firms there will be an astronomical difference between the wage rates paid to senior management and that paid to shop floor workers. In such situations, the average wage will appear to be much higher than what is really received by the majority of workers. Therefore, in situations where data is available it is important to examine these wage differentials, for example, by using the median instead of the average, to enable a better understanding of who is really gaining from the expansion of these industrial activities and what the impact on living standards really are.

Potential Data Sources: ILO, National Statistics

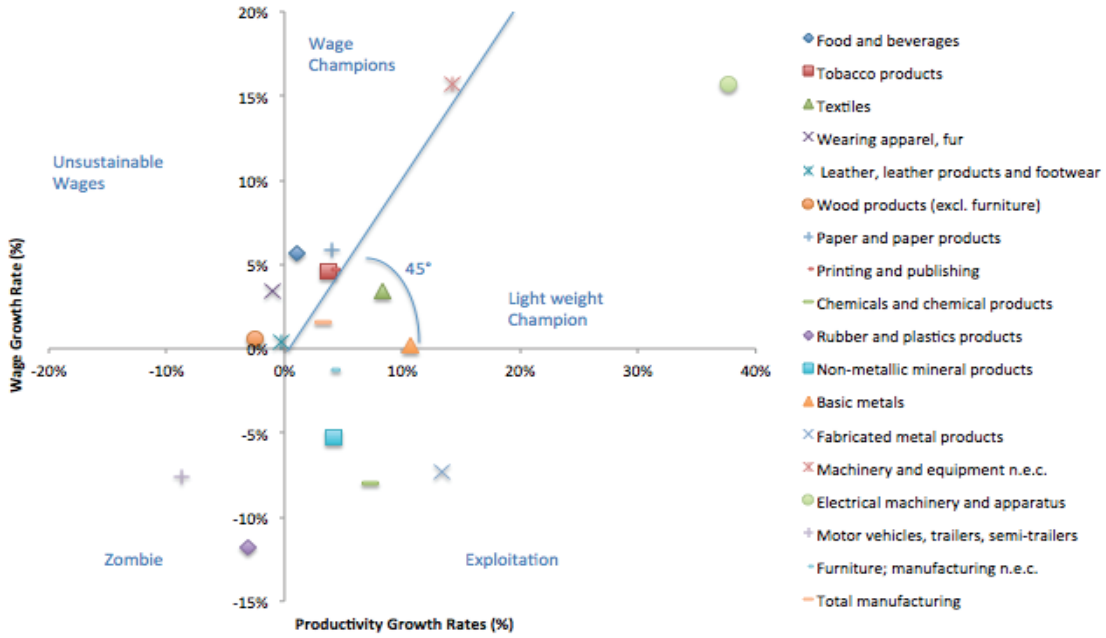
Sub-sector Wage and Productivity Analysis (Formal and Informal)

A wage decline may be due to a number of factors such as a decline in productivity, but it may also be due to business owners trying to suppress wages as a mechanism to minimise costs and maximising profits. This is a very important consideration, particularly in the context of globalisation, as businesses are increasingly competing on the basis of low wages. Currently, many manufacturers in developing countries have moved into highly competitive world markets and are increasingly dependent on low costs to maintain their "comparative advantage". In such situations, firms may try to maintain low prices by keeping labour costs to a minimum (e.g. by suppressing wages). Regardless of whether this may be a necessary strategy in the short-term, in the medium or long-term these activities will never provide citizens with improvements in their living standards (which is fundamental definition of development) and, therefore, countries will need to strategise on ways to either upgrade these activities (see *EQuIP Tool 3: Industrial and Export Upgrading*) or move into other sectors which have better prospects for wage increases.

We can check and see if wages are being artificially suppressed by looking at the wage elasticity of productivity. This indicator will tell us what percentage increase we can expect from a 1% increase in productivity and, therefore, helps us to identify how much productivity gains are actually benefiting workers. In order to determine the wage elasticity of productivity we will need to first compute the CARG of wages over a period of time for each of the sub-sectors. Then we will need to calculate the CARG for productivity, which we can do easily from the datasets used in the "Sub-Sector Employment Analysis" section, as productivity can be approximated by dividing sub-sector value added by employment. Once the growth rates are known, the wage CAGR can be divided by the productivity CAGR to get the wage elasticity of productivity. The wage elasticity of productivity will tell us what percentage increase in wages we can expect form a percentage increase in productivity (based upon past performance). Like in the employment elasticity analysis, this elasticity number is not always easy to interpret, so we can use a simple scatter plot diagram to help us classify the wage performance of each sub-sector.

Conceptual Devise 2 is a scatter plot diagram with a 45-degree line in the upper right quadrant, which classifies sub-sectors on the basis of their position in the scatter diagram. We can put the productivity growth rates on the x-axis and the wage growth rates on the y-axis.

Conceptual Devise 2/Figure 10: Interpreting the wage elasticity of productivity in industrial sub-sectors (Ethiopia 2000-2009)



Data Source: INDSTAT

We can think of the 45-degree line in the upper-right hand quadrant as the "fairness line" where wage increases exactly correspond to productivity increases. As can be seen from **Conceptual Devise 2**, any sub-sector that lies above the 45-degree line may be labelled as a "wage champion" as there are very high returns to labour from productivity gains. Any sector which falls below the 45 degree line, but which is still above zero may be called "lightweight champions" as these sectors are experiencing wage increases but to a more moderate extent. Sub-sectors that fall in the bottom right-hand quadrant are experiencing productivity gains but declining wages, which is an indication of "exploitation" or artificial wage suppression. In the bottom left-hand quadrant, there is negative productivity and wage dynamics, which may be classified as a "zombie" sector because it is alive but deteriorating. Finally, the upper left-hand quadrant illustrates sectors where wages increase corresponding with negative productivity trends, which means that those wage increases are likely to be unsustainable and, therefore, should not be counted on for future livelihood generation unless productivity is boosted.

Utilising a scatterplot diagram may be useful for categorising different sectors along the lines outlined above, but we will also be interested in estimating the exact wage elasticities, because as with the employment elasticities, this number may become useful when setting targets and estimating the wage effects of different industrial interventions. Following these steps of analysis for the formal sector we would therefore end up with a result in a datasheet like **Table 8**.

Table 8: Formal sub-sector wage and productivity analysis for Ethiopia 2000-2009

Sub-Sector	Wage CAGR	Productivity CAGR	Wage Elasticity of Productivity	Classification
Food and beverages	6%	1%	5.67	Champions
Tobacco products	5%	4%	1.22	Champions
Textiles	3%	8%	0.41	The Underdog Champion
Wearing apparel, fur	3%	-1%	-3.54	Unsustainable Wage increases
Leather, leather products and footwear	0%	0%	-1.16	Unsustainable Wage increases
Wood products (excl. furniture)	1%	-2%	-0.22	Unsustainable Wage increases
Paper and paper products	6%	9%	0.67	The Underdog Champion
Printing and publishing	5%	4%	1.16	Champions
Chemicals and chemical products	-8%	7%	-1.11	Exploitation
Rubber and plastics products	-12%	-3%	3.77	Zombie Sector
Non-metallic mineral products	-5%	4%	-1.27	Exploitation
Basic metals	0%	11%	0.02	Exploitation
Fabricated metal products	-7%	13%	-0.55	Exploitation
Machinery and equipment n.e.c.	6%	14%	0.44	The Underdog Champion
Electrical machinery and apparatus	16%	38%	0.42	The Underdog Champion
Motor vehicles, trailers, semi-trailers	-8%	-9%	0.86	Zombie Sector
Furniture; manufacturing n.e.c.	-1%	4%	-0.31	Exploitation
Total manufacturing	2%	3%	0.50	The Underdog Champion

Data Source: INDSTAT

Table 8 draws attention to some promising but also problematic trends in the Ethiopian economy. As suspected, we can see exploitation occurs within the furniture sector but what is perhaps most troubling is the non-metallic mineral sector. Although this sector is generating a high number of new jobs (as we saw from our employment analysis), the employees in this sub-sector are not getting their fair share of productivity gains and are likely having their wages artificially suppressed by their employers[6]. In contrast, **Table 8** reveals that in the food and beverage industry, there is a high wage elasticity to productivity, which means that as productivity improves in this sector, workers should continue to earn proportionately higher wages. It is in this way that the food and beverage industry may be expected to contribute to a rapid improvement of living standards for the 45,000 people employed in this formal sub-sector.

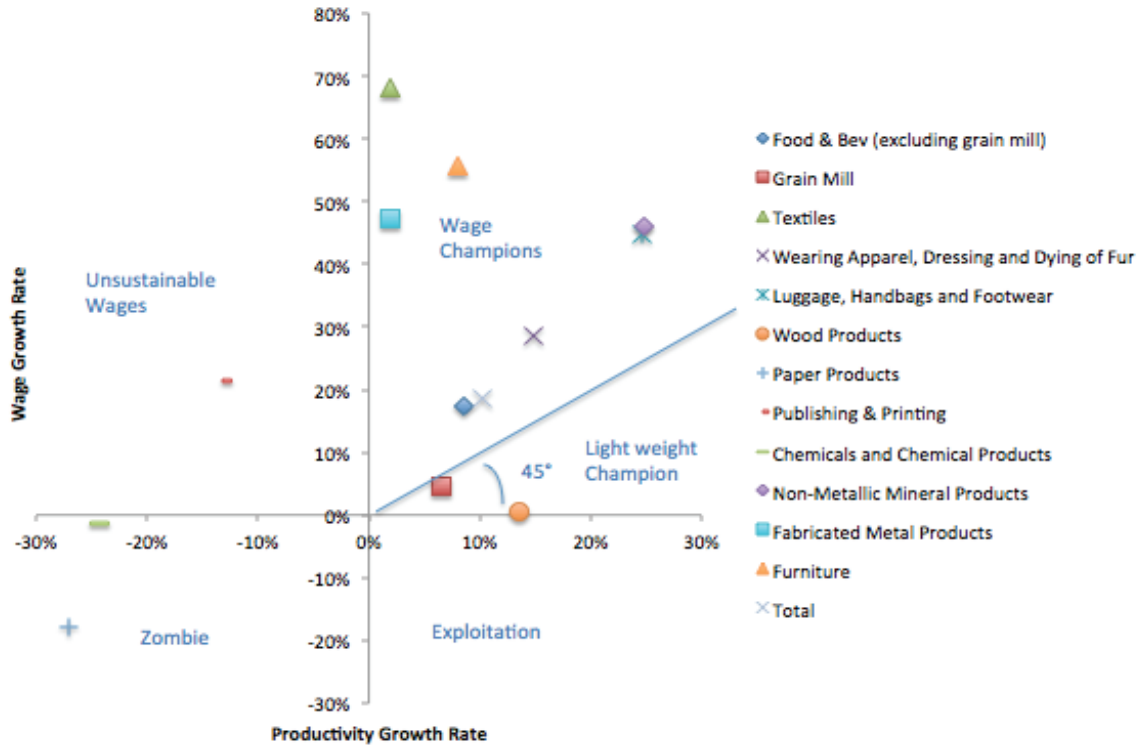
Informal employment is inherently more precarious than formal employment and, therefore, informal workers will have less bargaining power in terms of their wages and are therefore more vulnerable to exploitation. We can use the same methodology to compute the wage elasticity of productivity to get a better understanding of how much informal workers are benefiting from rising industrial productivity. Using **Conceptual Devise 2** we once again create a scatter diagram to

6 From the first analysis of wage trends, we saw a dramatic drop in the wage rate in 2009 and, therefore, we will look at more recent data to determine whether the wages have rebounded and what the current wage elasticity to productivity would be.

categorise informal sub-sectors on the basis of their informal wage performance.

Figure 11 and **Table 9** show a positive situation whereby the vast majority of sub-sectors are "wage champions" within the informal sector, which means that workers are experiencing significant wage improvements as productivity increase in the informal sector. It is interesting to note that the furniture sector that we identified as "exploiting" their workers in the formal sector are shown in the informal sector as "wage champions". The rapid growth of employment in the informal furniture sector (employment growth of 41%) may therefore be undermining the bargaining position of the formal sector workers as business owners have increasing access to informal producers. This may also account for the convergence we are seeing in terms of the wage rates between the informal sector (approx. US$ 500/employee) and the formal furniture sector (approx. US$ 600/employee).

Figure 11: Interpreting the wage elasticity of productivity in informal manufacturing sub-sectors, Ethiopia 2001/2 and 2007/8



Data Source: Central Statistics Agency of Ethiopia

The informal sector is a fundamental reality of modern industrial relations and employment dynamics. Despite this, it is too commonly ignored in statistics and industrial policy processes. This analysis, therefore, sheds light on the "shadow economy" and will help policy makers think about how industrialisation is affecting their most vulnerable working populations and the relationship between informal and formal employment. Industrial policy strategies regarding the informal sector are complex and certainly not clear-cut. On the one hand, informal employment will be on average less productive, provide lower wages and more vulnerable employment opportunities than in the formal sector. On the other hand, the informal sector *generates jobs*, particularly for low-income, uneducated workers and often serves as a "cushion" in times of economic crises. From a poverty alleviation perspective, the importance of this should not be underestimated. Depending on the national priorities, different governments will prioritise different actions but the purpose of this analysis is to ensure that informal workers are considered when making strategic decisions to improve social performance.

Table 9: Informal sub-sector wage and productivity analysis for Ethiopia (2001/2 and 2007/8)

Sub-Sector	Productivity CAGR	Wage CAGR	Wage Elasticity of Productivity	Classification
Food & Bev (excluding grain mill)	8%	17%	2.04	Champion
Grain Mill	7%	5%	0.71	Lightweight Champion
Textiles	2%	68%	35.82	Champion
Wearing Apparel, Dressing and Dying of Fur	15%	29%	1.94	Champion
Luggage, Handbags and Footwear	25%	45%	1.82	Champion
Wood Products	14%	1%	0.04	Lightweight Champion
Paper Products	-27%	-18%	0.66	Zombie
Publishing & Printing	-13%	21%	-1.63	Unsustainable Wage Increases
Chemicals and Chemical Products	-24%	-1%	0.05	Zombie
Non-Metallic Mineral Products	25%	46%	1.85	Champion
Fabricated Metal Products	2%	47%	23.75	Champion
Furniture	8%	56%	6.86	Champion
Total	10%	19%	1.83	Champion

Main Objectives of Sub-Sector Wage Analysis

One of the central tenants of "inclusiveness" is that people not only *participate in* the industrialisation process but also *benefit from* it. This is a critical social consideration as in our contemporary global economy we have all become familiar with images of sweatshops and exploitive manufacturing facilities. As outlined in the "setting the stage" analysis, there is a conceptual trade-off between labour productivity and employment generation. However, it is argued that enhanced productivity will benefit workers in the form of enhanced wages. An understanding of this trade-off is important, but in reality there are many exceptions to these rules. We can identify situations where there are very high returns to workers and we can identify situations where their wages are being artificially suppressed. From this analysis, industrial policy makers are able to identify manufacturing sub-sectors, which are contributing to improved living standards and those that are exploiting their workers so that they can catalyse on positive trends and mitigate negative ones.

5. Estimating Indirect Effects

Although it is important to generate as much employment *within* manufacturing as possible (especially at earlier stages of development), there can also be powerful *indirect* social effects of industrialisation. Historically, the industrial sector has played a very unique role in development through its indirect employment and income generating effects. Manufacturing has traditionally had very strong backward and forward domestic linkages, which means that when one sub-sector grew there were strong positive spill-over effects in terms of employment and income generation across the supply chain (see *EQuIP Tool 4: Diversification – Domestic and Export Dimensions* for more information on benefits of "embedded" and diverse industrial sector).

Broad-based employment is vital to an inclusive industrial development trajectory. The two main *indirect* drivers of broad-based sectoral growth are consumption and production linkages. The consumption linkage means that the income earned through industrial employment generates greater demand for locally produced goods and services. This is why focusing on wage increases for the working poor is so important, since this population spends the majority of their income on locally produced necessities (e.g. initially food products will be demanded and then as their incomes rise, demand for basic manufactured goods increases), while rich people tend to either save their money or spend it on imported luxury goods. The production linkage indicates that the expansion of manufacturing activities leads to greater demand for and investment in input suppliers (which then lead to productivity spill-overs through backward linkages) and eventually, greater investment in product upgrading (which leads to greater value addition and the development of forward linkages). It is in this way that the manufacturing sector, if well embedded in the domestic economy, can be a vital driver of multipliers and a more inclusive growth trajectory (See *EQuIP Tool 7: Global Value Chain Tool* for more information on why we cannot take local embeddedness for granted in contemporary global production networks).

The traditional way to estimate multipliers and examine inter-sectoral linkages is through an Input-Output (I-O) table. However, many low-income countries do not have I-O tables and they can be quite intimidating to work with. Therefore, this tool includes **Conceptual Devise 3,** which is a simplified table that takes the I-O tables of 33 low-income countries over the period of 21 years and presents the ten sectors with the highest average backward linkage to nine major manufacturing sub-sectors. There are obviously many issues with this type of generalisation and, therefore, we have presented backward linkage corridors (e.g. the strength of linkages in bottom 10% and top 90%). What these tables tell us is that if, for example, there is a US$ 100 increase in demand for food and beverage products, we can expect somewhere between a US$ 13 to US$ 77 increase in agricultural production to meet this demand. The objective of this table is, therefore, to help analysts to take a step back and look at the larger social dynamics that are, or could be, at play as a result of their industrial structure. Similar to our growth rate and elasticity analyses, the limitation of using I-O multipliers is that is assumes technology was the same over the years of analysis.

Conceptual Devise 3: Estimating Inter-Sectoral Linkages in Low-Income Countries

Food & Beverages	BW Corridor	
	10%	90%
Food & Beverages	1.06	1.17
Agriculture	0.13	0.77
Finance & Business Activities	0.03	0.28
Wholesale Trade	0.02	0.11
Petroleum, Chemical & Non-Metallic Mineral Products	0.01	0.10
Transport	0.01	0.09
Wood & Paper	0.01	0.07
Fishing	0.01	0.06
Metal Products	0.01	0.06
Electricity, Gas & Water	0.01	0.04

Electrical & Machinery	BW Corridor	
	10%	90%
Electrical & Machinery	1.17	1.34
Finance & Business Activities	0.15	0.34
Metal Products	0.07	0.15
Wholesale Trade	0.05	0.13
Petroleum, Chemical & Non-Metallic Mineral Products	0.05	0.10
Transport	0.02	0.06
Post &Telecommunications	0.02	0.04
Wood & Paper	0.01	0.03
Electricity, Gas and Water	0.01	0.04
Transport Equipment	0.01	0.03

Textiles & Wearing Apparel	BW Corridor	
	10%	90%
Textiles & Wearing Apparel	1.05	1.22
Finance & Business Activities	0.08	0.33
Petroleum, Chemical & Non-Metallic Mineral Products	0.05	0.26
Wholesale Trade	0.03	0.14
Transport	0.02	0.10
Wood & Paper	0.01	0.06
Agriculture	0.01	0.20
Electricity, Gas & Water	0.01	0.05
Electrical & Machinery	0.01	0.04
Post & Telecommunications	0.01	0.04

Transport Equipment	BW Corridor	
	10%	90%
Transport Equipment	1.13	1.33
Electrical & Machinery	0.23	0.37
Finance & Business Activities	0.10	0.28
Metal Products	0.06	0.14
Petroleum, Chemical & Non-Metallic Mineral Products	0.05	0.11
Wholesale Trade	0.04	0.11
Transport	0.02	0.06
Other Manufacturing	0.01	0.03
Post & Telecommunications	0.01	0.03
Wood & Paper	0.01	0.03

Wood & Paper	BW Corridor	
	10%	90%
Wood & Paper	1.12	1.26
Finance & Business Activities	0.06	0.25
Petroleum, Chemical & Non-Metallic Mineral Products	0.03	0.10
Wholesale Trade	0.03	0.10
Agriculture	0.02	0.49
Transport	0.03	0.08
Electricity, Gas & Water	0.02	0.05
Electrical & Machinery	0.01	0.04
Post & Telecommunications	0.01	0.03
Metal Products	0.01	0.03

Other Manufacturing	BW Corridor	
	10%	90%
Other Manufacturing	1.01	1.03
Finance & Business Activities	0.07	0.27
Wood & Paper	0.06	0.14
Metal Products	0.04	0.13
Petroleum, Chemical & Non-Metallic Mineral Products	0.05	0.13
Electrical & Machinery	0.04	0.13
Wholesale Trade	0.04	0.11
Transport	0.03	0.08
Transport Equipment	0.01	0.04
Post & Telecommunications	0.01	0.03

Petroleum, Chemical & Non-Metallic Mineral Products	BW Corridor	
	10%	90%
Petroleum, Chemical & Non-Metallic Mineral Products	1.17	1.37
Finance & Business Activities	0.15	0.33
Wholesale Trade	0.05	0.10
Transport	0.04	0.10
Mining & Quarrying	0.03	0.14
Electricity, Gas & Water	0.03	0.07
Electrical & Machinery	0.02	0.05
Wood & Paper	0.02	0.05
Metal Products	0.02	0.04
Construction	0.01	0.04

Recycling	BW Corridor	
	10%	90%
Recycling	1.01	1.04
Petroleum, Chemical & Non-Metallic Mineral Products	0.05	0.40
Transport	0.03	0.28
Mining & Quarrying	0.00	0.27
Finance & Business Activities	0.07	0.20
Metal Products	0.04	0.17
Wholesale Trade	0.04	0.04
Wood & Paper	0.06	0.03
Electricity, Gas & Water	0.01	0.04
Electrical & Machinery	0.04	0.04

Metal Products	BW Corridor	
	10%	90%
Metal Products	1.19	1.45
Finance & Business Activities	0.11	0.29
Wholesale Trade	0.04	0.11
Electrical & Machinery	0.04	0.08
Petroleum, Chemical & Non-Metallic Mineral Products	0.04	0.08
Transport	0.03	0.10
Electricity, Gas & Water	0.02	0.08
Mining & Quarrying	0.01	0.05
Construction	0.01	0.04
Post & Telecommunications	0.01	0.03

Data Source: EORA: Multi-Region Input-Output Database

Looking at the case of Ethiopia, for example, the rapid expansion of the food and beverage sector (in terms of productivity, wages and employment) would be positive in terms of its indirect effects. From the "Setting the Stage" analysis we know that the majority of the population is still engaged in agriculture and, therefore, as this sector grows it should increase demand for the food inputs being produced by the rural poor, thereby having a positive *indirect* poverty alleviating effects.

The table may also help analysts to look at the industrial system as a whole, and to consider the main inputs required for each of the activities. For example, we can see that petroleum, chemicals and non-metallic mineral products are very important inputs for most of the manufacturing activities. Therefore, we can imagine that the growth or decline of these sub-sectors would have large *indirect* employment effects, even if they themselves were not the most employment intensive sub-sectors in the economy. It is in this way that we can start to look at the economy as a whole and recognise that there could be situations where the most positive employment benefits of industrialisation could materialise outside of industry all together.

Main Objectives of Estimating Indirect Effects Analysis

Promoting an inclusive industrialisation process requires broad-based sectoral growth that generates quality employment opportunities. Part of this process will occur within manufacturing activities directly but a lot of it will be a result of the indirect effects of industrialisation. The manufacturing sector is one piece within a much richer economic landscape, which connects people through the production and consumption of goods and services. The objective of this analysis is to look at the other areas that could be affected as manufacturing activities expand their potential socio-economic consequences. It is also about recognising that the most socially beneficial industrial policies may not be about industry at all, they could, for example, focus on promoting the necessary infrastructure and input markets for a successful manufacturing industry. Or it could be about strengthening inter-sectoral linkages to maximise multiplier effects. It is in this way, that this analysis may help policy makers take a step back and look at the economy as a whole and all of the *indirect* methods that could exist to generate quality employment and minimise poverty through industrial development.

6. Maximising the Inclusiveness[7] of Industrial Development

This entire *Industrial Employment and Poverty Alleviation Tool h*as been structured so as to maximise the poverty alleviating effects of industrialisation. As this tool is designed for analysts in lower-income countries we have placed great importance on an employment intensive industrial growth trajectory, which is broad-based and recognises the importance of individuals not only *participating in*, but also *benefiting from* the industrialisation process. Moreover, by taking the time to really examine dynamics occurring in the informal sector we are already much more conscious of the real impacts of industrialisation on the poor (who tend to be concentrated in the informal sector). Taken all together, we can say that the information we have gathered and analysed so far is a solid starting point to consider industrial interventions that contribute to poverty alleviation. However, there are a couple of additional broad strategic considerations that analysts should bear in mind to maximise the poverty alleviating effects of industrial development. The first relates to women's economic empowerment as a direct method of bolstering informal social safety nets and reducing poverty. The second, is a consideration of the skill requirements of various manufacturing activities as the vulnerable and poor populations tend to have lower skill-sets and are therefore less likely to be absorbed within medium and high-tech industries. In this section we will therefore examine two additional factors, which can enhance the *inclusiveness* and poverty alleviating power of industrial development.

Methodology

1) Female Share of Employment

Strategic Questions

Which sub-sectors, if any, are dominated by women?

Which sub-sectors are actively absorbing more women?

Data and sources for computing female share of employment

Indicator	Variable	Source
Female Share Employment	Female Employment	INDSTAT or National Statistics
	Total Employment	INDSTAT or National Statistics

Illustrative Method

Table with classifications on basis of high (›40%), medium (25-40%) and low (‹20%) female labour absorption

7 Inclusiveness is a very rich concept, which includes a variety of considerations. This tool will only capture a narrow facet of inclusiveness and analysts may also be interested in analysing statistics on youth employment, regional inequality, ethnical minorities and more depending upon their country context and main socio-economic objectives of the government.

2) Gender Wage Gap

Strategic Questions

In which sub-sector is wage discrimination occurring?

In which sub-sectors are women's wages increasing over time relative to men's?

Data and sources for computing gender wage gap

Indicator	Variable	Source
Gender Wage Gap	Average Female Wage	National Statistics
	Average Male Wage	National Statistics

Illustrative Method

Table with classifications on basis of no (›100%), low (›85%), mid (85-65%), high (65-50%) or a very high (‹50%) gender wage gap/discrimination

Analysis and Interpretation of Findings

Women's Economic Empowerment

The first strategy to maximise the inclusiveness of industrial development is based upon the now well-documented fact, that the quickest and most effective way to alleviate poverty is to economically empower women. Research shows that when women have access to financial resources in low-income countries, they are far more likely to ensure food security, basic needs fulfilment and invest in children's schooling, which is vital not only for the reduction of poverty but also for the building of future productive capacities in the country. Moreover, a recent study illustrated that in lower-middle income countries, women are far more likely to spend their income on family-targeted durable goods, such as washing machines and kitchen appliances (which would then supports stronger inter-sectoral multipliers within the economy as outline in the *Indirect Employment Effects* section above).

Identifying sectors that are providing productive employment opportunities for women should be a core objective of industrial policy. In the exact same way that we analysed overall employment trends, we can easily look at the female share of employment in each sector over time to get an idea of which sectors have the highest concentration of women and whether there has been an increase in the female share of employment over time. However, in many situations, manufacturing activities may become feminised as a strategy to minimise costs because women are paid lower wages than their male counterparts. Therefore, it is vital to examine the gender wage gap, to get an idea of how much women are being paid relative to men in each of the sub-sectors over time (e.g. how much wage discrimination exists in the sub-sector).

The simplest way to undertake this analysis is to take two years and to examine the male and female employment and wage rates for each of the sectors. The female share of employment is calculated by dividing the number of female employees by total employment in the sub-sector. With this information we can classify each sub-sector on the basis of whether there is high (›40%), medium (25-40%) or low (‹20%) female labour absorption. Two years should be examined to identify if the female share of employment has been increasing or decreasing over time.

Once we have calculated the female share of employment, we can then look at the gender wage

gap by dividing the total wages by the number of employees (for both men and women) and then dividing the female average wage by the male average wage to get an idea of how much women are paid relative to their male counterparts. In a similar fashion we could then classify each of the manufacturing sub-sectors on the basis of whether there is no (›100%), low (100-85%), mid (65-85%), high (50-56%) or a very high (‹50%) gender wage gap/wage discrimination within the sub-sector.

From this analysis, we will be able to get an understanding of whether women are actively participating in manufacturing activities and if they are experiencing wage discrimination but we will not know about the casualisation of their labour. Women traditionally tend to take on the majority of household work and therefore are more likely to be engaged in part-time or flexible work arrangements in the market economy. We would therefore highly recommend, in the same way we did within the "sub-sector wage analysis" to examine female casualisation rates when data is available.

Table 10: Women's economic empowerment analysis for Ethiopia 2001- 2010

Sector	F Share Emp 2001	F Share Emp 2010	F Wage Share 2001	F Wage Share 2010	Classification
Food and Bev	19%	28%	88%	88%	Low Absorption, Moderate Descrimination
Tobacco	41%	45%	306%	105%	HighAbsoption, No Descrimination
Textiles	41%	46%	91%	49%	HighAbsoprtion, Very High Descrimination*
Wearing Apparel	67%	68%	79%	53%	High Absorption, High Descrimination*
Tanning and Dressing of Leather, Footwear	28%	34%	78%	90%	Mid Absorption, Low Descrimination
Wood Products	16%	13%	111%	121%	Low Absorption, No Descrimination
Paper	38%	41%	96%	81%	High Absoption, Mid Descrimination
Chemicals	27%	35%	93%	69%	Mid Absoption, High Descrimination*
Rubber and Plastic	29%	40%	77%	59%	High Absorption, High Descrimination*
Non-Metallic Mineral	12%	17%	112%	108%	Low Absoption. No Descrimination
Basic iron and Steel	15%	17%	91%	86%	Low Absorption Low Descrimination
Fabricated Metal	16%	17%	105%	233%	Low Absorption No Descrimination
Machinery and Equipment	12%	18%	76%	120%	Low Absoption, No Descrimination
Motor Vehicles, Trailers and Semi-Trailers	13%	16%	122%	81%	Low Absorption Mid Descrimination*
Furniture	12%	18%	157%	97%	Low Absorption, Low Descrimination
Total Manufacturing	27%	31%	112%	93%	Mid Absorption, Low Descrimination

Data Source: Employment Data (INDSTAT), Wage Data (Central Statistical Agency of Ethiopia)
Note: Asterisk (*) denotes worsening situation

Table 10 is an example of what the results of this analysis may look like. Sectors with high female labour absorption and no wage discrimination can be classified as having high poverty alleviation potential (in the case Ethiopia only the tobacco sector meets this criteria). However, this analysis may also help to better identify poor social performers. In the case of Ethiopia, for example, we can see that in the wearing apparel sector (which is a female dominated sector) women have gone from earning 79 cents for every dollar earned by men in 2001, to earning 53 cents in 2010. Trends in the textile industry are even more alarming and raise concerns of a suppression of women's wages over time in this sub-sector. This feminisation of the work force may account for the gradual decline in wages we saw in the textile industry despite a rapid rise in productivity. Hence, this analysis may help to identify whether sectors are contributing to poverty alleviation through women's economic empowerment (e.g. are they absorbing women and paying them a fair wage?).

Highly Recommended Additional Indicator: Informal Gender Dynamics

The analysis above was done on gender dynamics in the formal manufacturing sector. However, women are commonly concentrated in the informal economy, particularly in situations where there is increasing sub-contractualisation. It is important to understand if, and to what extent, women are benefitting from these home-based work activities. Therefore, if data is available, it is absolutely *critical* that analysts conduct this gender analysis for informal manufacturing activities, as this information will enable the analyst to maximisation of the poverty alleviating effects of industrial policies by targeting sectors where women are being gainfully employed.

Potential Data Sources: National Statistics

Skill Requirements and Technology Classifications

There is a conventional wisdom in industrial development that technology transfers from high-income to low-income countries will be the latter ones´ saving grace. However, we must always remember that these technologies were developed within a country context where capital is abundant and labour is scarce. This is certainly not the reality in low-income countries. Whilst the long-term objective should be to move into medium and high technology sectors to produce more VA, this longer-term objective needs to balance out a recognition that in situations of extreme poverty the majority of the population will invariably be low skilled and, therefore, will not be easily absorbed within these industries. It is, therefore, imperative to take a more balanced approach to sector promotion by recognising that while there are certainly valid reasons to promote highly sophisticated activities, there are equally valid reasons to promote labour-intensive sectors that can generate jobs for your working poor.

The *EQuIP Tool #2: Manufacturing Sub-sector Competitive Performance* presents a table that may help to classify sectors on the basis of whether they are resource-based, low-tech or medium-high tech (for more details on the justifications for these classifications see the tool). The methodology and reasoning outlined in that tool certainly preferences medium/high tech activities but in this tool we will focus on utilising the technology classifications as a proxy for skill requirements. From the perspective of poverty alleviation resource-based and low-tech sectors will be preferred, based on the assumption that they will require lower-skills and, therefore, will more easily absorb poor population.

Conceptual Devise 4: Technological classifications for sub-sectors

Sub-sector	Technology Classification	ISIC (rev 2) codes
Food, beverages and tobacco	Resource based	15, 16
Textiles, wearing apparel and leather products	Resource based	17, 18, 19
Wood and paper products	Resource based	20, 21
Metal products	Low-tech	27, 28
Coke, refined petroleum, non-metallic mineral products and rubber	Low-tech	23, 2510, 26
Machinery, equipment and telecommunications	Medium/High tech	29, 30, 31, 32, 33
Transport equipment	Medium/High tech	34, 35
Chemical and plastic products	Medium/High tech	24, 2520
N.E.S. (incl. furniture, recycling and publishing and printing)	Low tech	36, 37, 22

Source: UNIDO

It must be noted however, that a promotion of low-tech sectors is a *short-term* strategy for poverty alleviation. In the long-term the government should focus on education and skills upgrading to build human capabilities, which are required for more sophisticated manufacturing activities (See EQuIP Tool 9: Industrial Capabilities for skills assessment). In the medium to long-term, if social considerations are prioritised, we would hope to see the establishment of a "virtuous circle" between industrial development, employment and poverty alleviation. Whereby industrial development leads to expanding employment opportunities with rising productivity that absorb the poor and underemployed thereby increasing their income. As a result of inclusive growth, these poor populations will be able to spend more money on the education and skills development of their children (especially if women are economically empowered), thus boosting the next generations productive capabilities, which allows for a progressive movement into more sophisticated manufacturing activities.

Main Objectives of Maximising the Inclusiveness of Industrial Development

Poverty alleviation is necessarily the predominant socio-economic objective for low-income countries. Industriali ation can greatly contribute to this objective when it spurs a process of broad-based quality employment generation. This process is in no way automatic however, and indeed, modern history has seen too many situations where industrialisation has only functioned to exacerbate inequalities because it excluded the working poor. If poverty alleviation is to be taken as a serious consideration when developing industrial strategies, then it is very important to think about the *pattern* of industrialisation to ensure that it is providing expanding and improving employment opportunities, which are accessible to your most vulnerable populations. This analysis considers an industrial structure's performance in terms of women's economic empowerment and accessibility to lower-skilled workers.

7. Setting Targets

The sub-sector analysis so far focused on a single country while using a variety of indicators to better understand the social performance of industry. This helps to identify priority activities, which could be targeted to improve the social performance of industry. However, once it moves from an identification of priorities to the setting of targets, we need to think about some additional methods.

Targets Based on Past Performance

The types of indicators we have calculated so far provide us with a strong understanding of past trends in employment, wages, productivity, etc. We can therefore utilise the growth rates we calculated as estimates for future performance. For example, if we found that there were 450,000 people employed in the food and beverages and that employment in this sub-sector has grown on average 5% per year, we can estimate that this sub-sector will likely generate about 22,500 new manufacturing jobs each year, and therefore we can monitor progress on this baseline.

Estimating Social Effects of Economic Targets

Many of the indicators we calculated were fundamentally related to economic dynamics (i.e. the growth of MVA and productivity). Therefore, in situations where sectors were chosen on the basis of economic rationales (e.g. export competitiveness, technological sophistication, growth potential, etc.), we can use the employment and wage elasticities we calculated to estimate the employment and wage effects of targeted industrial expansion. For example, if the ministry of industry has set a target of expanding textiles value added by 10%, we can expect a 60% decline in employment over the same time period. Ideally, the analysis will also help to balance out the overall industrial strategy by highlighting that some sectors are more *socially* desirable than others and therefore should be considered for promotion.

Identifying a Role Model

The major issue with both methods outlined above is that they are inherently based upon *what you have achieved* not *what you want to achieve*. A solid understanding of past performance is vital in order to set realistic targets but the greatest industrial policy success stories have defied realistic estimates and their "comparative advantage". An analysis of past performance may shed light on what can be expected to occur in the economy if it is "left to its own devices" but it cannot tell us much about the untapped potentials in terms of employment or wage generation if the government chooses to move into new activities or sectors. It is, therefore, very important to identify a "role model", which may exemplify the types of social performance they want to see in their industry. Identifying such "role models" is not a straight-forward process, however, since every country has a unique industrial structure, which is embedded in the historical and politico-economic context. Despite this significant obstacle, it is particularly important for low-income countries with nascent industrial structures to examine what is *possible*. One way to achieve this is through a ***literature review of best practices*** in terms of your particular social objectives. If, for example, a government wants to promote an employment intensive industrialisation trajectory, analysts can use existing literature to identify countries that have achieved this goal and examine how their industrial structure evolved and at what point they moved into new activities or exited old activities. The drawback of this approach is that while there is no limit to the amount of literature about employment, poverty or wage best practices *broadly,* there is little existing literature, which applies specific dynamics as they correlate with industrialisation trends. Therefore, we should also consider some quantitative

methods of analysis to complement our qualitative research.

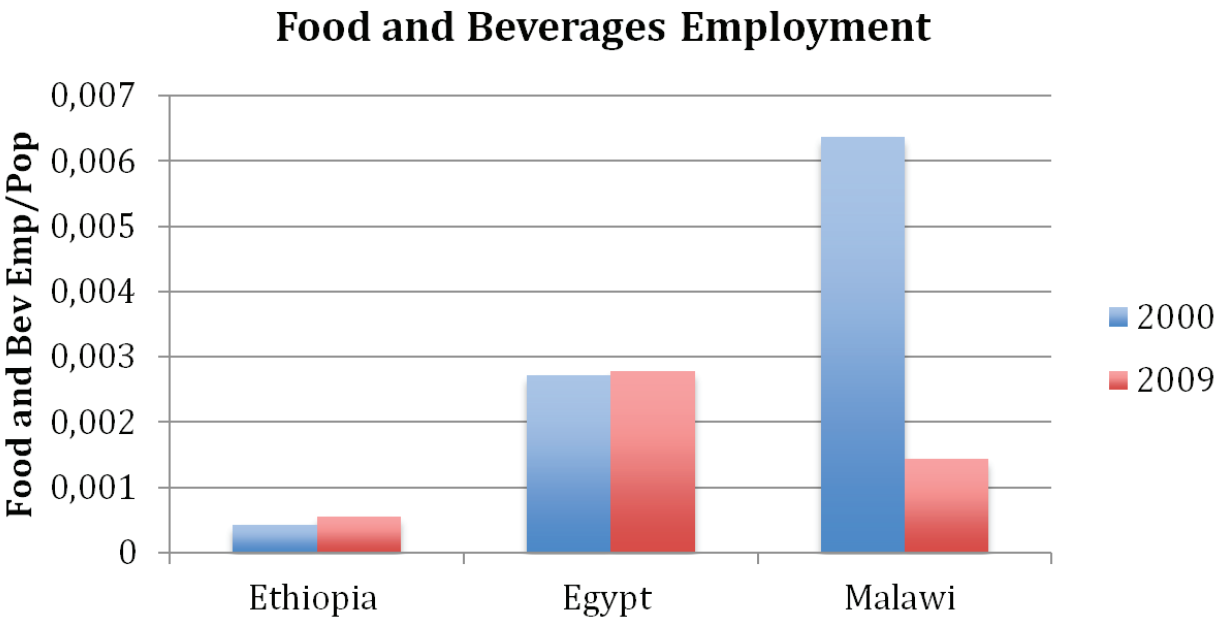
Setting Targets on the Basis of Benchmarking

These indicators can also be used to identify comparator countries to benchmark against. You could go through the INDSTAT and quickly compute the wage growth rates for all countries. You can then sort this list so that the best performers are on top. From there you will have to sort through this list and identify a couple of countries which have similar income levels and relatively similar socio-economic structures, as well as a couple which are slightly more advanced. Once the comparator countries have been chosen we can examine the economy and identify which sub-sectors were driving these wage increases and at what point in time. This can then help you to think about the structure as a whole and set a more realistic target in terms of what you think could be achieved within a given time frame (e.g. five to ten years).

Alternatively, from this analysis you may have already identified some priority sectors and simply want to get a better idea of what wage rate is possible to achieve in those sectors. In this case we could simply look at, for example, the textile wage rates for all countries, identify some relevant country comparators, and then set your target on the basis of their performance. This process is incredibly important, as otherwise there is a risk of setting either unambitious targets (based on past performance) or incredibly unrealistic targets (based on political ambition) and this benchmarking exercise can help ground your targets in some empirical evidence.

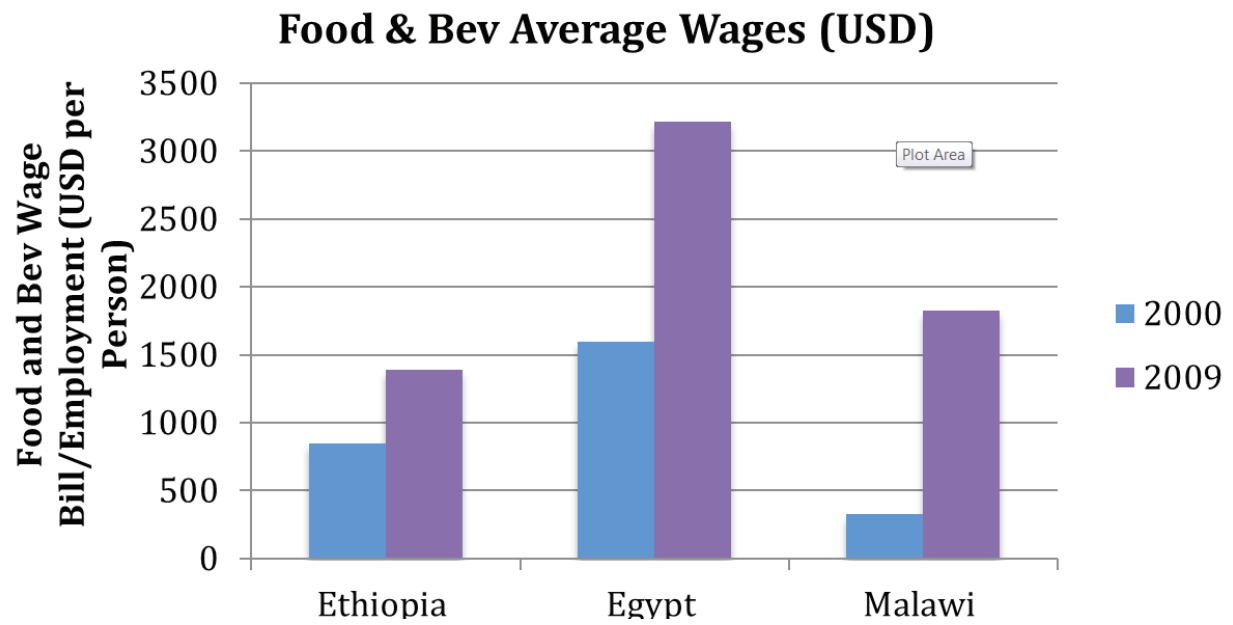
If for example, Ethiopia decides that they would like to focus on the food and beverage sector (due to it's positive social performance) and the textile industry (due to it's negative social performance). We could use INDSTAT data to get an understanding of how some relative benchmark countries are performing in terms of employment and wage generation. In this example, we will use the same benchmarking countries as we used in our initial "setting the stage" analysis (e.g. Ethiopia, Malawi, Egypt and Kenya). Due to the lack of sub-sector employment data for Kenya we will only be able to compare performance better Ethiopia, Malawi and Egypt.

Figure 12: Employment per capita in food & beverage manufacturing sub-sector



Source: INDSTAT

Figure 13: Average wages in food & beverages manufacturing sub-sector

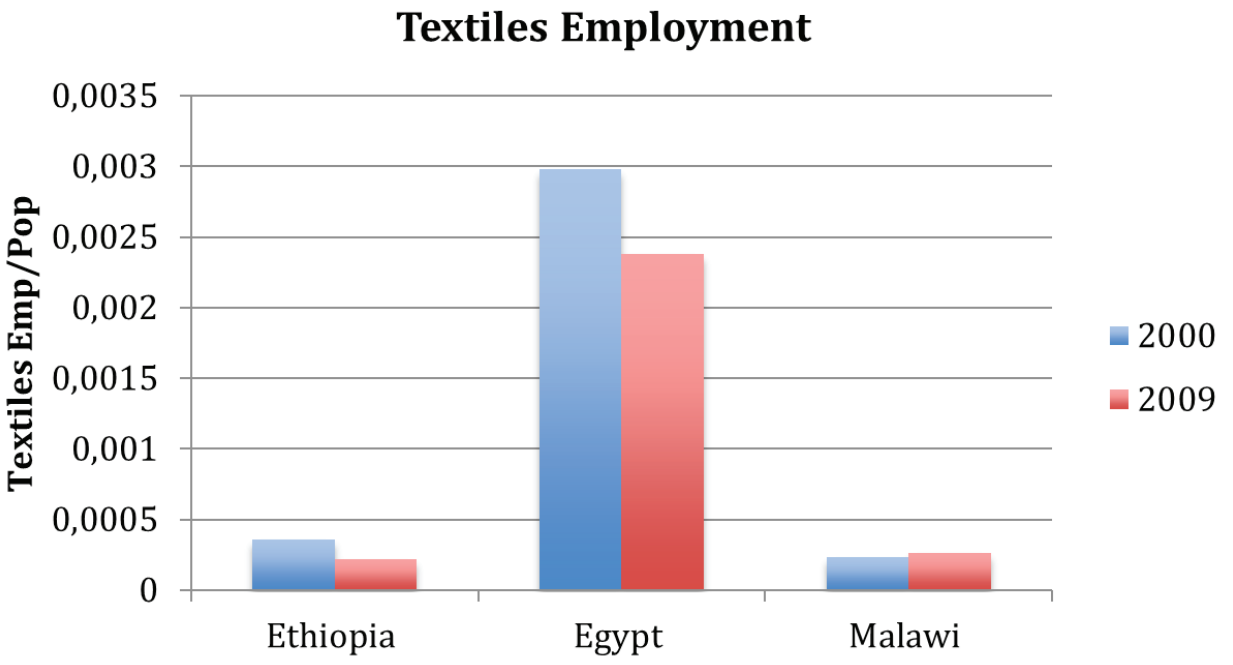


Source: INDSTAT

From **Figure 12 and 13** we can evaluate the relative performance of Ethiopia's food and beverage sector. From this analysis, we can see that there is potential to generate a large amount of additional employment within the food and beverage sector. Moreover, the positive performance of Egypt in both employment and wages could function as a "target" for Ethiopia's industrial strategy.

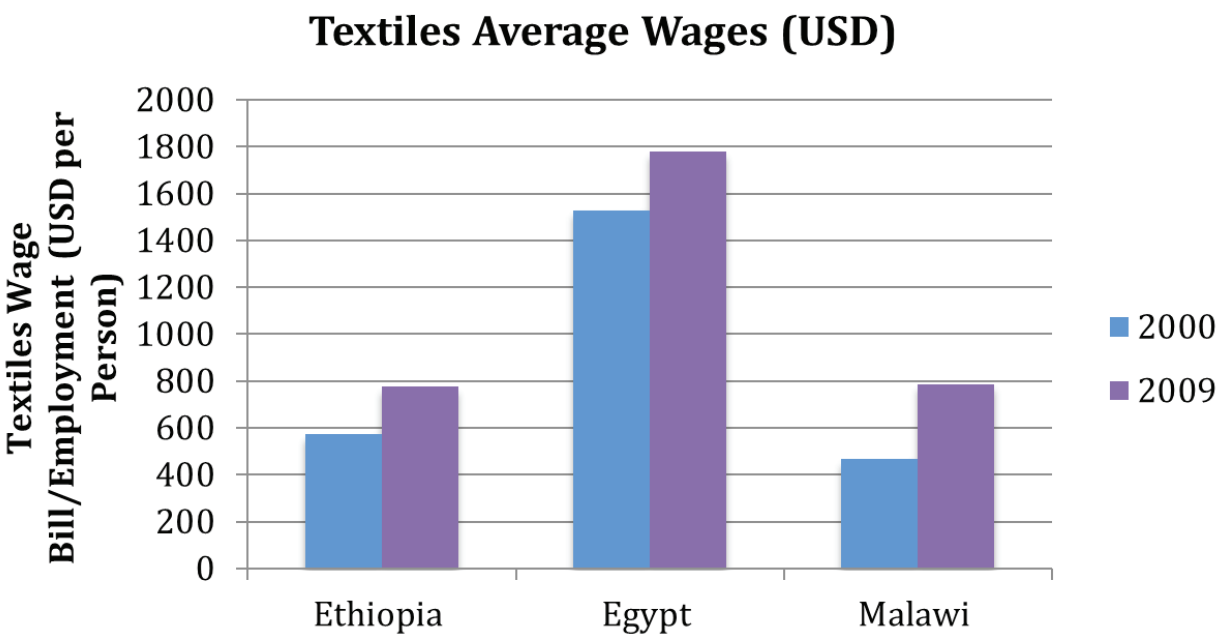
We can then perform a similar analysis for the textiles sub-sector.

Figure 14: Employment per capita in textile manufacturing sub-sector



Source: INDSTAT

Figure 15: Average wages in textiles manufacturing sub-sector



Source: INDSTAT

From **Figure 14 and 15** we can see that all countries have been having difficulty increasing their employment levels in the textile sector during the 2000-2009 period which could indicate that that Ethiopia is not alone in it's experience of "jobless growth" in this sub-sector. From the wage analysis, Egypt stands as the clear best performer so we could conduct some further research and see which textile products Egypt is predominantly engaged in, so that Ethiopia could strive to move into these activities over time.

Main Objectives of Setting Targets

Industrial Policy was largely discredited for three decades because of the belief that "free markets" would produce optimal socio-economic outcomes and naturally facilitate the development of the economy. While history has shown this assumption to not be true, it does not mean that the challenges of government intervention in the economy have decreased. It is impossible to predict the future and to have a full understanding of all dynamics at play that might affect your industrial trajectory, but inspiration may be gained from other's experiences when establishing industrial action plans and targets. A solid understanding of past performance is absolutely vital in order to ensure that the objectives and targets are appropriate for the existing socio-economic context. However, in order to move towards more ambitious targets and identify new activities, analysts shall learn from the past experience of others.

8. Conclusion

Table 6 is an example of what a concluding table could look like, however, depending on the information the analyst thinks is most important. They may decide to include more raw data in the tables or exclude some classifications altogether. Aggregating all of this information together may help to get a broader understanding of the socio-economic dynamics occurring in the industrial structure and is, therefore, vital to identifying potential points of intervention to promote a more inclusive industrial development trajectory.

Table 6: Illustrative final table from inclusiveness analysis

Sector	Formal/ Informal Employment	Formal/Informal Wage Performance	Gender Dynamics	Tech Classiciation	Strongest Linkages
Food and beverages	High Productive Employment/ Moderate Productive Informal	Champion/Champion	Low Absorption, No Descrimination	Resource-Based	Agriculture, Finance & Business, Trade
Tobacco products	Moderate Productive Employemnt/ N/A	Champion/NA	HighAbsoption, No Descrimination	Resource-Based	N/A
Textiles	Jobless Growth/ High Productive Informal Employment	Lightweight Champion/Champion	HighAbsoprtion, Very High Descrimination*	Resource-Based	Finance & Business, Petroleum, Chemical and Non-Metallic Miner
Wearing apparel, fur	Unproductive Employment/High Productive Informal Employr	Unsustainable Wage increases/ Champion	High Absorption, High Descrimination*	Resource-Based	Finance & Business, Petroleum, Chemical and Non-Metallic Miner
Leather, leather products and footwear	Unproductive Employment / N/A	Unsustainble Wage increases/ N/A	Mid Absorption, Low Descrimination	Resource-Based	N/A
Wood products (excl. furniture)	Unproductive Employment/ Jobless Growth	Unsustainble Wage increases/ Lightweight	Low Absorption, No Descrimination	Resource-Based	Finance & Business, Petroleum, chemical and non-metallic minera
Paper and paper products	Moderate Productive Employment/ Dying Sectors	Champion/Zombie	High Absoption, Mid Descrimination	Resource-Based	Finance & Business, Petroleum, chemical and non-metallic minera
Printing and publishing	High Productive Employment / High Productive Informal Empl	Champion/ Unsustainble Wage increases	N/a	Low-Tech	Finance & Bsuiness, Wood & Paper, Metal Products
Chemicals and chemical products	Moderate Productive Employment/ Unproductive Employmer	Exploitation/ Zombie	Mid Absoption, High Descrimination*	Medium-High Tech	Finance & Business, Trade, Transport, Mining & Quarrying
Rubber and plastics products	Unproductive Employment/ N/A	Zombie/ N/A	High Absorption, High Descrimination*	Low-Tech	N/A
Non-metallic mineral products	High Productive Employment/ Moderate Productive Informal	Exploitation/ Champion	Low Absoption. No Descrimination	Low-Tech	Finance & Business, Trade, Transport, Mining & Quarrying
Basic metals	Moderate Productive Employment/ N/A	Exploitation/ N/A	Low Absorption Low Descrimination	Low-Tech	Finance & Business, Trade, Electrical & Machinery
Fabricated metal products	Moderate Productive Employment/ High Productive Informal	Exploitation/ Champion	Low Absorption No Descrimination	Low-Tech	Finance & Business, Trade, Electrical & Machinery
Machinery and equipment n.e.c.	Jobless Growth / N/A	Champion/ N/A	Low Absoption, No Descrimination	Medium-High Tech	Finance & Business, Metal Products, Trade
Electrical machinery and apparatus	Unproductive Employment/ N/A	Lightweight Champion/ N/A	N/A	Medium-High Tech	Finance & Business, Metal Products, Trade
Motor vehicles, trailers, semi-trailers	Dying Sector/ N/A	Zombie Sector/ N/A	Low Absoption, Mid Descrimination	Medium-High Tech	Electrical & Machinery, Finance & Business, Metal Products
Furniture; manufacturing n.e.c.	High Productive Employment /High Productive Informal Empl	Exploitation/ Champion	Low Absorption Low Descrimination	Low-Tech	Finance & Bsuiness, Wood & Paper, Metal Products
Total Manufacturing	High Productive Employment/ Moderate Productive Informal	Lightweight Champion/ Champion	Mid Absorption, Low Descrimination	N/A	N/A

The fundamental objective of the EQuIP toolbox is to provide analysts in low-income countries with a series of simple and intuitive analytical tools that may help them to promote a more *Inclusive and Sustainable Industrial Development* process. This tool only looks at one-dimension of industrial development and must be complemented by the other tools, which consider issues of industrial growth, competitiveness, resource-efficiency, etc. This inclusiveness tool is designed to complement and be complemented by the other tools in the EQuIP toolbox so that analysts look at a myriad of different industrialisation dynamics and strategies. There is no “one-size-fits” all industrial strategy, as it will inherently be based upon the specific social objectives of the country in question. The objective of the *Industrial Employment and Poverty Alleviation Tool* is to empower analysts in lower-income countries to promote and defend social agenda’s within their industrial policy process through the use of quantitative diagnostics.

9. Suggested Further Reading

GIZ (2014) *Guidelines for an Employment and Labour Market Analysis (ELMA)*

Ianchovichina, E. & Lundstrom, S (2009). *Inclusive growth analytics: framework and application*. World Bank Policy Research Working Paper (4851)

International Labour Organization (2012) *Employment diagnostic analysis: A methodological guide*

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Mitra, Arup (2013) *Can Industry be the Key to Pro-Poor Growth? An Exploratory Analysis of India*. ILO Asia-Pacific Working Paper Series

United Nations Development Programme (2013) *Industry-Agriculture Linkages: Implications for Rice Policy*. Discussion Paper No. 9

United Nations Industrial Development Organization (2014) *Green Growth: From Labour to Resource Productivity. Best practice examples, initiatives and policy options*

United Nations Industrial Development Organization (2013) *Sustaining Employment Growth: The Role of Manufacturing and Structural Change*. Industrial Development Report 2013

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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
E-mail: policy@unido.org

DEUTSCHE GESELLSCHAFT FÜR INTERNATIONALE ZUSAMMENARBEIT (GIZ) GMBH
Friedrich-Ebert-Allee 40, 53113 Bonn, Germany
E-mail: sv-nawi@giz.de

Website: **www.equip-project.org**