# Assessing Private Sector Contributions to Job Creation and Poverty Reduction

# Open Source Study by

# International Finance Corporation

# Preliminary Literature Review

The articles that are a part of the literature review are only a small snapshot of the literature on job creation. We are in the preliminary stages and expect to review additional relevant literature. As a part of the open source process, we want to share our work even if it is still in an early draft form to get your feedback. Please feel free to send us your thoughts on what is posted here.

**Contact:** Anastasiya Denisova

 e-mail: ADenisova@ifc.org

| **Article** | **Key Findings** | **Methodology** | **Estimates** | **Comments /Alternative Views** | **Data** | **Industry/Sector** | **Region/****Country** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Haltiwanger, Jarmim and Miranda (2010)**  | * There is no systematic relationship between net growth rates and firm size once firm age is controlled for.
* Firm births contribute substantially to both gross and net job creation.
* Conditional on survival young firms grow more rapidly than their more mature counterparts
 | Non parametric regression Dependent variable: net employment growth at the firm-levelExplanatory variables: firm size class, firm age class, interaction of firm size-age class.Controls: Year fixed effects, Industry fixed effects | Dependent on firms age/size cell. Please refer to Table 2 in the original paper.  | Comments: * Focus on rates versus absolute numbers
* Adds valuable insight to the discussion on if small firms in the United States in fact create proportionately more jobs than others.
 | Firm and establishment[[1]](#footnote-1) level data from Census Bureau's Longitudinal Business Database (LBD) for year 1976-2005 | multiple; classified at 4-digit SIC or 6-digit NAICS | US  |
| **Ayyagari, Demirguc-Kunt, Maksimovic (2011)**  | **Employment shares:** small mature firms have the largest share of employment in developing countries **Job creation:** * Small and mature firms have the largest share of job creation in developing countries
* If a country has experienced net job losses in the economy as a whole, it is only the small firms, especially small mature firms that have net job gains.
* Small firms are significant contributors to employment growth even after controlling for age
 | Log-Linear regression (simple OLS[[2]](#footnote-2) without weighting, SE[[3]](#footnote-3)s clustered at country level) Dependent variables: Employment growth, Sales growth, Labor productivity (Sales/Worker growth) Explanatory variables: Size (3 categories), age (3 categories), interaction of size and age Controls: industry, year, country, interaction of country and sector  | Dependent on the size and age of the firm. Please refer to Table 6 in the original paper.  | Comments: * Very good source of descriptive statistics for developing countries
* Provides some statistical evidence of small and medium firms not contributing to growth as much as large and mature firms do, despite contributions to employment
* Provides detailed results for manufacturing sector
 | Establishment[[4]](#footnote-4) level data for 99 countries from World Bank Enterprise Surveys (ES) for 2006-2010 | Multiple, but unclear which. 2-digit ISIC classification | 99 developing countries  |
| **Marfan, Meller (1981)** | * There is great variation among different industries in terms of the proportion that direct employment represents out of total employment created (direct+indirect). The range goes from 10% to 85%
* In 25 out of 40 manufacturing sectors direct employment effects are greater than 50% of the total effect
* Large industries create more indirect jobs (as indicated by larger multiplier), while small industries are more labor intensive and create more direct jobs relative to both indirect jobs and direct jobs for same industry large firms
* When based on the backward and forward linkages the following sectors are determined to be the key sectors (having either backward and forward linkage coefficient higher than 1[[5]](#footnote-5), or the sum of those higher than one), the following sectors are key: food and wood (large), wood (small), beverages (large), textiles(large), paper(large), leather(large), basic metals (large), machinery with exception of electrical and diverse manufactures (small). [[6]](#footnote-6)
 | * Input-output matrix using 1962 data
* Matrix consists of the intermediate transaction matrix, the final demand matrix (obtained from survey data), and matrix for value-added components
 | Dependent on industry. Please refer to Table 2 in the paper for relative shares of direct employment in total effect.Please refer to Table 3 in the paper for forward and backward linkages.  | Comments: * The paper provides good empirical approach to calculation of the indirect employment shares based on industry data and input/output matrices
* However, the data is almost 50 years old and one might assume that there was a significant change in technology and thus relative labor intensity of many industries both large and small.
 | * Input-output matrix (ODELPAN, *Cuardo de transacciones intersectorales para la economia chilena* [Santiago 1962]), valued at user’s prices. It includes 54 productive activities, of which 20 are manufacturing industries. Imports are treated as a separate matrix.
* Census of manufactures (*Instituto Nacional de Estadisticas, IV* *censo nacional de manufacturas* [Santiago, 1971].) The census provides information based on 1967 figures, for all industrial enterprises employing five or more persons. Classification: 2 digit ISIC.
 | 54 industries at 2 digit ISIC level, with 20 being broken down into large and small  | Chile |
| **Aroca (2001)** | * A significant difference in the Type I and II[[7]](#footnote-7) employment multipliers for a private versus a state owned firm does not reflect the labor intensity but rather a difference in the management style, where private firm outsources more tasks to other firms than a state owned does.
* Impact on total output is greater when the dollar goes to sectors associated with services, which are more labor intensive.
* Mining sector is not important in terms of backward and forward linkages within the region, but is very important in terms of its volume of production.
* The most important sectors in terms of the output backward and forward linkages are fishing, utilities (energy), retail and business services.
* Based on the multipliers author recommends a policy of workers immigrating into the region versus commuting, so the additional income is spent in the region.
 | Multipliers: Input Output matrix for 12 micro sectors constructed in Aroca 1999a built with a hybrid methodology that includes the use of primary and secondary data, which come from the official Chilean data sources (Statistical National Institute, INE, and the Central Bank.) Linkages: Measured by the coefficient of the Leontief Inverse MatrixEstimates:1. OPEN system-includes indirect effects only, due to the assumption that the additional income (wages) that is paid for a change in the final demand is not spent in the region;
2. CLOSED system-includes both direct and induced effects, due to the assumption that all additional income is spent in the region. “Therefore, the real impact should be some point between these two multipliers.”
 | Output Multipliers:* presented for the operational stage of the mining and other sectors
* The open system multiplier vary between 1.01(Real Estate) and 1.65 (Construction), which means for one additional dollar that is spent on final demand, the total output of the region increases by between US$1.01 and US$1.65 depending on which sector this dollar is spent in.

Employment Multipliers[[8]](#footnote-8): * Agriculture :1.06-1.13
* Fishing: 1.22-1.25
* Rest of mining sector: 2.04-2.76
* Private firm: 4.1-6.71
* Manufacture: 1.39-1.57
* Utilities: 4.54-6.29
* Construction: 1.2-1.57
* Retail: 1.1-1.27
* Transportation and communications: 1.12-1.22
* Business Services: 1.45-2.34
* Real Estate Services: 1.01-1.34
* Other services: 1.04-1.21
* Public Administration: 1.03-1.09
 | Comments: * Presents a table of Type I and Type II multipliers for employment generation for 12 sectors (real estate services, agriculture, construction, transportation and communication, mining, manufacture, retail, fishing, business services, public administration, utilities, other services) in Chilean II region
* Expands on the results of the Aroco 1999b paper for employment multipliers by breaking down the mining industry into private and state owned firms.
* The analysis is based on one region of Chile, so worker migration might be more of a concern than it would have been in a country level study
* The dollars are assumed to be spent in the location of where a worker lives assuming out remittances.
* One has to be careful with using the multipliers for current estimation as even though the paper is published in 2001 the results are based on the IO matrix derived from 1995 data, so depending on technological progress in any of the sectors the results might or might not be relevant to the current period.
 | Statistical National Institute, INE and the Chilean Central Bank data for 1995.  | * Agriculture
* Fishing
* Mining
* Manufacture
* Utilities
* Construction
* Retail
* Transportation and communication
* Business Services
* Real Estate services
* Other services
* Public Administration
 | Chile Region II |
| **Asiedu (2004)** | * Good infrastructure, higher income, openness to trade and ad educated labor force have a significant positive impact on employment by US multinational enterprises in sub-Saharan Africa
 | Random –effects panel estimation[[9]](#footnote-9)Dependent variable: log (number of employees of foreign affiliates/total labor force in the host country) Explanatory variables: (i) share of trade in GDP – a measure of openness to trade of the host country’s economy;(ii)the percentage of literate population – a measure of the stock of human capital in the host country; (iii) number of telephones per 1000 population – a measure of infrastructure availability; (iv) real GDP per capita – a measure of the level of income; (v) a dummy variable which takes on the value of 1 if the share of minerals and ores in the host country’s export exceeds 50% or if the host is an oil-exporting country – a measure of natural resource availability. Controls: trend variable (year fixed effects) to control for changes cause by demand of supply shocks.  | * Please refer to Table 4 in the paper
* All else being equal a 1% increase in infrastructure leads to a 0.3% increase in employment
* 1% increase in the literacy rate leads to 0.02% increase in employment rates
* The coefficient on natural resource rich indicator is not statistically significant
 | Comments:* Contributes to the discussion of factors that contribute to higher employment rates by US multinational enterprises in sub-Saharan Africa
* Industry level controls are not included
* Possible reverse causality
 | 1983 to 2000Data from Bureau of Economic Analysis, U.S. Department of Commerce  | Multiple industries | 34 countries in sub Saharan Africa |
| **McKinsey Global Institute (2011)**  | * Answers 3 main questions: How companies use labor? Where new jobs are likely to come from? What conditions are needed to ensure robust & sustainable job creation?
* At the recent pace of job creation, it will take more than 60 months after GDP reached its prerecession level in December 2010 for employment to recover (assuming the total net job creation 117,000 jobs per month on average.)
* McKinsey designed three possible scenarios for job creation, based on sector analyses, and find that they deliver from 9.3 million to 22.5 million jobs by the end of the decade.
* Six sectors illustrate the potential for job growth in this decade: health care, business services, leisure and hospitality, construction, manufacturing and retail (these sectors are projected to increase their share of jobs created from 66% today to 85%.)
* Under current trends, the US will not have enough workers with the right education and training to fill the skill profiles of the jobs that are likely to be created. Based on the interviews MGI has conducted there are potential shortages in occupations such as nutritionists, welders, nurse’s aides, computer specialists and engineers.
* There is a prediction for rapid growth in part-time and contingent employment, which might enable companies to bring some service jobs back from abroad.
* Health care is highlighted as a sector in which large efficiency gains or significant cost controls unaccompanied by job-creating innovation could slow rates of job growth (highlighted job-creating areas of innovation are primary care, chronic disease management, geriatric care.)
 | * Three scenarios: low-job growth, high-job growth, midrange job growth done by sector
* Scenarios are built based on macroeconomic forecasts of sector job growth combined with McKinsey’s own analysis of industry trends
* Focus on six major sectors, which are determined to be key in the job creation for US economy: health care, business services, leisure and hospitality, construction, manufacturing, and retail
* For detailed information on assumptions for each of the scenarios in each sector see Exhibits A2 and A3 in Appedix A of the report (pages 64-65)
 | Estimates of job creation in millions for 2010-2020: high-middle-low scenarios* Health care: 5.2-4.8-2.8
* Business services[[10]](#footnote-10): 5.7-4.0-2.4
* Leisure/Hospitality: 3.3-2.8-2.1
* Government: 1.7-1.7-1.6
* Construction: 1.8-1.3-0.9
* Manufacturing: 0 –(-1.1)-(-2.3)
* Retail trade: 1.2 -0.6 –(-0.8)
* Financial activities: 0.9-0.9-0.7
* Other services: 0.8-0.7-0.4
* Education: 0.5-0.5-0.5
* Other[[11]](#footnote-11): 1.2-1.2-1.0

Estimates for connection between employment growth, productivity growth, and GDP growth by sector for low and high scenarios see exhibits A4 and A5 in Appendix A of the report (page 65)  | Contributions/Importance: * Provides a good picture of job creation by sector in the U.S. for the decade 2010-2020 taking in account a range of scenarios
* Provides numerical estimates for direct job creation by sector
* Provides numerical estimates that connect job creation to productivity and growth by sector.
 | Census Data, American Community Survey, Bureau of Labor Statistics (BLS), Industry data, McKinsey Survey data, Interviews with companies, macroeconomic forecasts and sector demands. For job creation scenarios in particular: sector level employment an GDP projections from external macroeconomic forecasters (Moody’s Analytics, BLS, Global Insight); sector specific trends (expert and client interviews and quantitative analysis); historic rates of employment of employment and productivity in each sector. For detailed information on interviews and business surveys see Appendix B of the report (pages 75-81) | NAICS 2 digit classification where from 23 industries the focus is on 6: * Health care
* Business Services
* Leisure/Hospitality
* Construction
* Manufacturing
* Retail Trade
 | US |
| **Acs, Armington, Robb (1999)** | * Gross job flow rates decline with age and with increasing establishment size when controlling for age differences (both initial size and mean size classifications.)
* Firm size differences contribute little or nothing additional when establishment size and age are controlled for
* Relationship between net job growth rates and firm’s size is very sensitive (positive when the mean size classification is used, negative when the initial size classification is used.)
 | Multivariate cell-based regression analysis weighted by the sum of the employment of all establishments in each (page 34). Cells are created by grouping all the establishments with similar characteristics (age, establishment size, type of firm (single or multi-unit), industry sector, and firm size) into one cell. (see pages 30-31 for detailed explanation) Dependent variable(s): gross and net job flows in the existing establishmentsExplanatory variable(s): age, firm size, establishment size  | Coefficients for gross(net) job creation regressed on size, age, and other characteristics of the establishment. Please refer to page 40 in the article. | Comments: * Provides an account of relationship for the job creation and size and age of the firm/establishment.
* Authors remark that the results might not be representative of the long run dynamics
* Authors remark that there is no framework for handling job creation and job destruction for establishment birth only for existing establishments
 | Longitudinal Establishment and Enterprise Microdata (LEEM) from Center for Economic Studies, which includes both manufacturing and non-manufacturing data. Data for 1990, 1994, 1995. This file was constructed by the Census Bureau from its Statistics of U.S. Business (SUSB) files, which were developed under contract to the Office of Advocacy of the U.S. Small Business Administration | multiple | US |
| **McKinsey Global Institute (2010)**  | * Proposes a definition of a competitive sector as one in which companies improve their performance by increasing productivity through managerial and technological innovations, and offer better quality or lower-priced goods and services, thereby expanding demand for their products
* Instead of focusing on the mix of industries countries should focus on their competitive industries individually
* **For above-average growth countries their existing large employment sectors –such as retail and restaurants; food processing; and construction – pull their weight by posting slow growth**
* **For job creation large businesses and services (in particular household services) sectors is considered to be the key. Meanwhile countries seem to be looking at sectors like manufacturing as the source of growth and job creation**
* Regulation that facilitates business entry tends to increase competition and productivity, while **flexible hiring laws, lower minimum wages, and part-time employment arrangements correlate with higher employment** and more rapid adjustment to change
* Innovative emerging sectors themselves are too small to make a difference to economy wide growth
* Sector specific policy is proposed after sectors are grouped into six categories: 1) infrastructure services, 2) local services, 3) business services, 4) research and development (R&D)-intensive manufacturing, 5) manufacturing, 6) resource –intensive industries.
 | * Case studies.
* Six sectors for sector specific policy recommendation are chosen based on two criteria: 1) tradable vs nontradable 2) degree of differentiation
 | * Provides historic data on growth of labor productivity and employment for high-income and middle income countries (Exhibits 8 and 9) based on 1985-2005 data
* Identifies the largest employment sectors in US based on 2009 data to be retail trade, financial activities, and construction
* Provides case studies for particular country/industry combinations
 | Comments: * Identifies the policies by sector/country that can promote job creation and growth
* Identifies service sector as the one with the highest potential for job creation
* Case study based
 | * National account data; case studies; World Bank, Global Insight, ILO, MGI analysis, McKinsey sector growth data base for more than 100 ISIC 2-digit level industries.
* Focus is on six industries: retail, software and IT services, tourism, steel, automotive, and semiconductors.
 | Multiple (more than 100 ISIC 2digit) with focus on six  | EU-15, Argentina, Bolivia, Brazil, China, Colombia, Costa Rica, Egypt, Hungary, Jordan, Malaysia, Peru, Philippines, Poland, Romania, Slovakia, Sri Lanka, Thailand, Turkey, and Uruguay. |
| **Autor, Levy, Murnane (2003)**  | * Within the framework of authors’ model computer capital (1) substitutes for workers in performing cognitive and manual tasks that can be accomplished by following explicit rules; and (2) complements workers in performing non-routine problem solving and complex communications tasks
* Within industries, occupations, and education groups, computerization is associated with reduced labor input of routine manual and routine cognitive tasks and increased labor input of non-routine cognitive tasks
* Translating task shifts into education demand, the model can explain 60 percent of the estimated relative demand shift favoring college labor during 1970 to 1998. Task changes within nominally identical occupations account for almost half of this impact
* All the predictions are robust when gender of workers is accounted for
 | Task based theoretical model, where a task is defined to be "routine" if it can be accomplished by machines following explicit programmed rules. (Please refer to Table 1 in the paper for predictions of the model.) Fitting an equation is used to test hypothesis that: * Industries historically intensive in routine tasks should have adopted computer capital relatively rapidly as its price fell[[12]](#footnote-12). (computer adoption vs routine task share.)
* As industries adopt computer technology, model predicts that they will simultaneously reduce labor input of routine cognitive and manual tasks and increase labor input (change in industry input task vs percentage of industry workers using computer at their job)

Weighted means of economy wide task inputs by decade (disaggregated by gender) are used to test aggregate trend predictions of the model that: Rapidly declining price of computer capital should have reduced aggregate demand for labor input and routine tasks and increased demand for labor input and nonroutine cognitive tasks. “Fixed coefficients[[13]](#footnote-13)” model with educational requirements in industries and occupations as a function of their task inputs is used to form predictions of relationship between task shifts and changes in college employment. Benchmarked against predictions of the constant elasticity of production model with two factors: college and high school workers.  | **N/A** | Comments: * Provides a model for measuring task/skill demand within industry occupation
* Provides a model able to predict the evolution of labor demand for workers with different skill/educational levels.
* As authors point out the computerization is assumed to be determined exogenously of industry and occupation task change, while these might be simultaneously determined.
 | Data on job task requirements from the Dictionary of Occupational Titles (DOT) combined with samples of employed workers from the Census and Current Population Survey form a consistent panel of industry and occupational task input over the four-decade period from 1960 to 1998.Occupations are disaggregated to the 3-digit Census Occupation Code (COC). Sources: * Fourth [1977] Edition and Revised Fourth [1991] edition of the U. S. Department of Labor's Dictionary of Occupational Titles (DOT).
* Census Integrated Public Micro Samples [IPUMS, Ruggles and Sobeck 1997] one percent extracts for 1960, 1970, 1980, and 1990, and to CPS Merged Outgoing Rotation Group (MORG) files for 1980, 1990, and 1998.
 | Multiple | US |
| **Global Employment Trends (2011)**  | * Provides current employment statistics for 178 countries disaggregated by sector, age and gender
* Provides projections for the employment for 178 countries disaggregated by sector, age and gender
* Provides macroeconomic context for growth and employment
* Creates and provides data and projections for the “vulnerable employment[[14]](#footnote-14)” indicator, defined as the sum of own-account workers and unpaid family workers. This provides valuable insights into overall employment quality and informal work arrangements
 | * The Global Economic Trends Model (GET) is used to produce estimates for unemployment rate, total employment/unemployment, employment to population ration (disaggregated by age and sex when appropriate.)
* Weighted Multivariate Regression

Dependent variable: Estimates from GET(above)Explanatory variables: GDP growth To derive unemployment rate projections the historic relationship between unemployment and GDP growth estimated at the worst crisis/downturn between 1991 to 2005 is used (by country): Fixed effect panel regression Dependent variable: Estimates from GET(above)Explanatory variables: Multiple including GDP, lagged unemployment rate, GDP growth rate, lagged growth rate, log of GDP per capita, crisis and recovery dummies, interaction of these dummies with GDP growth.  | See Key Findings in the report  | Comments: * Provides current employment statistics for 178 countries disaggregated by sector, age and gender
* Provides projections for the employment for 178 countries disaggregated by sector, age and gender
* Provides macroeconomic context for growth and employment.
* Creates and provides data an projections for the “vulnerable employment” indicator, defined as the sum of own-account workers and unpaid family workers. This provides valuable insights into overall employment quality and informal work arrangements.
 | Primary data: Labor force surveys and/or population censusModels and projections are based on: * ILO, *Trends econometric models,* October 2010
* OECD Economic Outlook
* UN World Economic Situation and Prospects 2011.
 | * Multiple
* Aggregation to three sectors: industry, agriculture, services.
 | Global178 countries |
| **Aterido, Hallward- Driemeier and Pages (2007)**  | * Low access to finance and ineffective business regulations reduce the growth of firms particularly micro and small firms.
* For the same amount of financing, smallest firms gain the most.
* Between exporters and non-exporters, improved capital markets have a greater impact on non-exporters
* Consistent enforcement helps all firms with greatest benefit to small firms.
* Costs of bureaucratic delays and red tape hurt all firms except micro firms
* Corruption hampers growth in small, medium and large firms. In the case of incidence of bribes the effect is to increase growth of micro firms
* Inadequate infrastructure hurts all firms. In the case of power outages, the detrimental effect of outages is felt more keenly by exporters and domestic producers regardless of size
* **Some tentative findings**: when business climate is weak firms may be confined to industries with limited innovation and growth opportunities.
* Larger shares of firms remain informal or semi-informal, reducing the capacity of the state in collecting taxes and broadening the resource base for critical expenditures.
 | * OLS regression

Dependant variableGrowth of employment of a firm by industry and in a country between periods t and t-3.Independent variables*Subjective* (perceived) business constraints by firm characteristics such as:* finance constraint rank
* rank of corruption electricity and labor regulations
* consistency of regulations

 *Objective* business constraints by firm characteristics such as: access to finance constraints* regulatory issues
* infrastructure

corruption | * For the same amount of financing, largest firms benefit but only half as much as micro firms
* An increase in the incidence of bribes of 10 percentage points reduces the employment rate of large firms by 1.4 percentage points and increases growth rate of micro firms by 1.4 percent
 | Comments:* Paper analyzes the impact of various constraints to finance, corruption, regulation and infrastructure across firm type and firm size.
* Paper uses narrower bands of firm size category with the category of “micro” added with under 10 employees that helps find significant differences between micro and small firms (11-50 workers)
 | Firm level data based on 70,000 enterprises in 107 countries. | Manufacturing, Services and Agriculture | Global covering 107countries including 5 developed countries  |
| **Bigsten and Soderbom (2005)** | * **Business Environment**: prime suspect as to why firm performance in Africa is poor; Often cited by managers as the leading constraint after financing; Leads to high indirect costs

Risk: --Firms with high uncertainty regarding future demand tend to have lower profits based on data from Ghanian manufacturing firms; --High risk force firms to have a more conservative product mix with a lower expected profit rate for eg. evidence from Zimbabwe suggests that firms respond to risk by increasing inventories -- Investments are held back more because of high risk rather than lower returns on investment -- Uncertainty has a negative effect on investment and more pronounced for irreversible investments. Access to credit:-- Demand for formal loans among African manufacturers is low: less than 20% of the firms in the sample had applied for a formal loan a year prior to survey. Among those applying majority of firms obtain loans. Wide differences across size distribution: among small firms loan applications are less common and lower success rate than large firms-- A firm maybe credit constrained even if it doesn’t apply for a loan. Around 55% of firms have no credit demand, 33% are credit constrained and 12% are unconstrained. Close to two-thirds of the micro firm appear constrained but only 10% of large firms. Around two-thirds the large firms choose not to participate in the credit market compared to a third of the micro firms. The smallest firms are credit constrained.-- Losing a banking relationship hampers investment. Based on an analysis in Uganda around 30 % of firms in sample lost one or several banking relationships, in part because 4 Ugandan banks closed due to impudent practices between 1998-1999. Following the Bank crisis, the average annual growth range of employment among firms that lost a banking relationship was 2.3-4% lower than average growth rate of unaffected firms.Labor and Skills--Unit labor costs tend to be higher in Africa than in other regions and high labor costs relative to international competitors imply poor global competitiveness. -- Large wage differentials across firms of differing size not explained by differential skills. Earnings in Ghana and Kenya vary positively with firm sized controlling for observed and unobserved worker skills over time. -- Weak evidence for increasing returns and constant returns to scale mainly because large firms can remain profitable because they face lower capital costs than smaller firms. This can be explained by access to formal credit-- Rising labor costs constrain firm growth and exports. The reasons for rising labor costs are a) presence of large unions in Africa. Union premium ranges from 3- 28% in Ghana, Kenya, Nigeria, South Africa and Tanzania controlling for observed worker skills. Unionization is related to highly correlated with other leading explanations for labor market distortions. Workers mange to bid up prizes wages by threatening to walk out if the firm refuses to accommodate their demands.Infrastructure--Poor infrastructure in Africa is likely to be a particularly severe constraint for manufacturing growth. Firms spend their own resources to buying infrastructure services or providing their own. -- Firms that rank infrastructure as severe are often the most productive. This is because these are the firms that sell on larger markets and are more dependent on infrastructure. * Manufacturing sector characterized by very large/informal firms that operate alongside with a small number of large-scale factories with a missing middle. One plausible explanation is that small firms do not want to grow in order to grow to avoid excessive regulation and underdevelopment spawns small firms.
* No significant differences in between formal and informal firms in Kenya. However it should be noted that firms in Kenya have encountered excessive red tape and corruption.
* Proportion of firms that perceive regulations as an obstacle to growth in lower in the informal than formal manufacturing sector based on on analysis in Cote d’Ivoire. With cost increases and small gains if any in productivity from being formal
* Trade Credit

--Trade credit plays an important role in firm financing in Africa, mainly by enabling firms to manage raw material inventories and by reducing likelihood of raw material shortages; Can contribute to higher productive efficiency;--Trade credit important in countries where average firm size is relatively high suggesting that large firms are more likely to use trade credit than small ones-- Firms that use trade credit have higher capacity utilization and less likely to have raw material stock outs than those without trade credit.-- Firms with entrepreneurial characteristics are likely to get trade credit. It is more common with firms that purchase inputs from suppliers that face greater competition. This is because firms that seek trade credit must establish credit worthiness and they must do so every time they switch to a new supplier.* **Tentative finding and needs more research**: All else equal, the relationship between growth and age is less negative (and more positive) for larger firms than smaller ones. The relationship between size and growth is less negative (and more positive) for old firms than young firms.
* Exit rates are significant and highest among smallest firms. Being relatively productive did not prevent firms from going out of business if they are small but mattered for large firms.
* Investment not particularly sensitive to changes in profit. Cash-flow sensitivity of investment is low even in small firms although it is slightly larger in part because small firms are more credit constrained.
* Firms have a higher opportunity costs of capital. Average returns on capital are much higher than in Africa than in developed countries and can be attributed to the uncertainty on the investment.
* Weak positive correlation between firm size and propensity to invest. The evidence points to irreversibility of the investment as the main reason for low investment.
* Technology transfer in African firms is slow. Reasons include asymmetry of information and other market failures.

**Exports: Two factors determine whether a firm will participate in exports.****--The level of entry barrier:** Firms face significant cost barriers t o enter export market for the first time. If there are significant costs, firms that have incurred these cost s in the past will enter export market again**-- Cost efficiency of potential exporter:** Based on evidence from Ethiopia, Ghana and Kenya, firms that export are more productive than non-exporters. Efficiency and exports might be correlated with learning effects. Participating in export markets has a positive effect on total factor productivity in subsequent periods and this is not true of regions outside Africa. | Review of research based on data sets generated by manufacturing level firm data and subsequent firm surveys in Africa | Unit labor cost is calculated as total labor costs divided either by value of output or value-addedEstimated elasticity of wages with respect to firm size is 0.15 in Ghana and 0.08 in Kenya. For example as employees grow from 20 to 40 wages will increase by 11 percent in Ghana and 6 percent in KenyaTrade credit form of payment in: Tanzania (8%), Zimbabwe 69%The average firm that did exporting in the previous period is likely to export by 0.57 while the likelihood of exporting for an otherwise identical firm that did not export is 0.18Productivity gains of 7-8% in an output production function corresponds to productivity gains in terms of value added of 20-25 percent in the short run and up to 50 percent in the long run | Comments:* In some countries Eritrea and Nigeria median unit labor costs are lower than in Uganda and Mauritius.
* One study documents higher average labor unit costs among firms in China than in Ghana, Lesotho, Madagascar, Mozambique and Kenya
 | Qualitative analysis of results of previous enterprise surveys | Manufacturing | Africa  |
| **Gutierrez, Precchia, Paci and Serneels (2007)** | * Not all growth leads to poverty reduction**:** For upper middle income countries, only changes in inequality affect growth.
* Aggregate productivity, intensity of growth and the aggregate employment intensity are negatively correlated with poverty reduction. Therefore, the impact of employment intensive growth is not different from productivity intensive growth.
* Sectoral patterns of growth do not matter for poverty reduction ie. Whether growth is concentrated in the primary, secondary or tertiary sector does not matter for poverty changes.
* Employment intensive growth in the secondary sector is negatively and robustly related to poverty reduction except during recessions. Employment intensive growth in agriculture is correlated with increases in poverty
* Productivity intensive growth in agriculture is associated with decreases in poverty
* Productivity intensive growth in the secondary and tertiary sectors has an ambiguous relationship with poverty

**Labor costs and Employment Growth:** **--**Employment intensive growth in manufacturing is affected by minimum wages having a negative effect --Minimum wages reduce secondary sector employment intensive growth while severance has the positive effect**.****--**Unionization does not affect employment intensive growth in secondary sector or manufacturing. **Education and Structure of Employment:** Education is important for fostering productivity growth in agriculture and alleviating poverty. --Lack of significance of the education variables in explaining employment intensive growth in manufacturing and the secondary sector.**Regulatory and investment climate**: --Openness to trade measured by import and export taxes limit employment intensive growth in the secondary sector and in manufacturing. --Macroeconomic stability and lack of price controls appear to promote employment intensive growth in manufacturing but inhibit productivity growth in agriculture--financial freedom is harmful for employment intensive growth in manufacturing and the secondary sector and the index of property rights is negatively correlated with agricultural productivity growth--Lower regulatory burden contrary to general wisdom and do not reduce povertyTrade and employment intensity”--Openness to trade is positively correlated employment intensive growth in manufacturing and the secondary sector as is terms of trade-- Agricultural productivity intensive growth is strongly related to terms of trade with better terms of trade decreasing such productivity--Being landlocked reduces employment intensive growth in manufacturing and the secondary sector and reduces agricultural productivity intensive growth | Equations are set up using the following theoretical notion:--A Shapley decomposition approach to understand how growth is associated with increased productivity and employment at the aggregate level and sectors.--Exploring the links between sectoral growth pattern, its productivity, employment intensity and poverty reduction impact-- Construct a growth spells where for each country, short term growth spells are constructed as the percentage change in value added per capita between two comparable points in time.A number of regressions are run covering change in employment, poverty and productivity improvement against sectoral growth in the primary, secondary and tertiary sectorFor labor costs and employment intensive growth**Dependant variable:** * intensive growth in manufacturing,
* secondary sector
* agricultural productivity growth;

Independent variables: * Minimum wage,
* minimum wage relative to the average,
* paid annual leave
* severance payment

For education and structure of employment:Dependant variables:* Secondary sector employment growth
* Agricultural intensive growth

Independent variables: * share of workers in agriculture,
* share of population with no schooling

For trade regulatory environment, investment climate and employment: Dependant variable:* Manufacturing employment intensive growth,
* employment intensive growth in secondary sector
* productivity intensive growth

Independent variables: * business regulation
* Trade
* Fiscal
* Government
* Monetary
* Investment
* Financial freedom
* Property rights
* Corruption

Trade and employment intensity:Dependent variables: * Employment intensive growth in manufacturing
* Employment intensive growth in the secondary sector

Independent variables:* Openness to trade
* Terms of trade
* Real effective exchange rate
* Foreign Direct investment
* Landlocked
 | **N/A** | Comments:* Analysis of the role of sectoral productivity and employment intensity in poverty alleviation
* Use of a decomposition methodology to construct a measure of employment intensive growth
 | Information on GDP from WDI; and sectoral GDP from UN National accounts; population from UN population division ; poverty from World Bank poverty database and employment from ILO-KILM database.Data coverage is from 1980-2004Data for determinants of growth patterns taken from:Data on unionization and strikers from Rama and Artecona 2002 and Sulla, Scarpetta and Pierre (mimeo World Bank)Data on regulatory environment/investment climate from: Heritage foundation; Data on FDI, openness to trade, being landlocked and real effective exchange rate taken from Sinnott and Lopez | **N/A** | Global |
| NCDO & Sustainalytics  | * Provides sector-dependent multipliers for indirect job creation
* Less developed economies tend to have large indirect employment effects than more developed economies
 | * Multipliers for indirect job creation are derived from the various input-output studies and are sector dependent
* Specific values are obtained by eliminating extreme values and computing the median of the remaining figures
 | **Potentialindirect**=number\_of\_employees\_local\*emplomentMultiplier**potentialForward**=potentiaIIndirect\*forwardJobDivision **potentialBackward**=potentialIndirect\*backwardJobDivision**forwardJobs**=potentialForward\*percRegionalSold/100**backwardJobs**=potentialBackward\*percRegionalPurchased/10 | Comments: * Provides a list of references for deriving indirect employment multipliers at the sector level for some countries
* Provides calculations for forward and backward jobs, poor people benefiting form jobs, for contributions to GDP leading to a reduction of Poverty, Child Mortality and Maternal Mortality and to increased enrollment in primary education
* Its ambiguous if multipliers are country specific and if the country effect comes in only through the import/export effects
 | Various input-output studies | All sectors covered by Sustainalitycs report  | Developing countries[[15]](#footnote-15) |
| **O’Higgins (2001)**  | * Opportunities for old and younger workers to replace each other are limited as the two types or workers are rarely substitutes and thus there should be a focus on labor market for the young people specifically.
* Unemployment is not evenly spread among different groups of young people. The groups that are mostly at risk are: those with low levels of educational attainment, the disabled, and ethnic minorities.
* The problems facing young women are less clear-cut, at least from an examination of unemployment rates, but strong arguments can be made for claiming that women also face additional difficulties in gaining access to high-quality employment.
* Since youth unemployment is primarily a consequence of inadequate demand emphasis should be placed on creating sufficient growth and improving the employment content. This could be achieved by sustained economic growth accompanied by action at the micro level.
* Higher youth wages do not necessarily lead to lower youth employment. Empirical research conducted in a number of countries shows that there is still much uncertainty about the direction and extent of the impact of the minimum wage on youth employment.
* The author suggests that measures to lower the labor costs of young people should go hand in hand with policies to improve their efficiency through better training and education.
* Closer link between industry and education: Based on German, UK, French and US experience proposes a vocational education policy closer related to the “world of work” and suggests creating a nationally regulated, universally accepted and highly standardized system of certification designed with the involvement of employers and worker’s organizations.
* Advocates adoption of the German type system of financing training as a way to share the costs between employers, the State and the trainees. Author highlights that a financial commitment by participants is likely to increase their desire to make the system work.
* Advocates the following policy solutions:
1. Policy based approach to job creation for youth would be the most effective in a healthy economic climate. However, the relative usefulness of different types of programs will vary with economic conditions (e.g. training and job search for the times of economic growth; employment subsidies or skill upgrade during the recession)
2. Targeting of policies so to avoid helping the youth that already can help themselves and thus increasing the inequality between different types of young people.
3. Proposes imposition of a compulsory training levy on firms with exemption of employers who offer job placements for trainees as an alternative solution to financing policies
4. Encouraging incentive or punishment programs for unemployed that emphasize maintaining an active link with the labor force (e.g. “activation” when one can lose the benefits if she refuses to participate in programs aimed at helping with employment.) However, mentions the danger of those compulsory programs to be a negative signal to firms and also attracting on average less motivated workers.
5. Involvement of workers’ and employers’ organizations
6. Monitoring and evaluation
7. Combination of training and employment programs instead of only off-the-job training or work-based placements.
8. Combination of self-employment policies and improved access to finance.
9. Changing the structure and content of the school curriculum as likely more effective than remedial programs for those who have left school and entered the labor market.
 | Review of various macro indicators, active labor market programs and program evaluations (non-experimental, weakly experimental, quasi experimental, highly experimental.) | **N/A** | * Provides insight into the dynamics of youth employment and suggests it should be analyzed separately from the overall employment.
* Analyzes connection of youth unemployment with aggregate demand, wages, and cohort size.
* Provides an overview of various labor market policies and their effectiveness.
* Proposes a framework for policies and interventions to improve employment outcomes for youth.
 | N/A | N/A | Global  |
| **Fares, Montenegro, Orazem (2006)** | Descriptive: * Schooling is a more important reason for men not to enter the labor market while home time use is more important reason for women not to enter the labor market.
* Unemployment is also more closely tied to higher enrollment rates and lower labor force participation rates in rural markets. Urban youth unemployment rates appear relatively uncorrelated with every other measure of labor market success aside from joblessness.
* Half of developed country youth aged 15-24 are still in school compared to 39% of developing county youth. These differences in human capital investments will shape the relative production activities and incomes for developing and developed economies into the future.
* There is a higher gap(5%) between developed and developing countries for rural youth labor force participation than for the urban (2%.)
* As country incomes rise youth employment rates come down, also because they devote more time to schooling.

Youth Unemployment: * There is no evidence that large youth cohorts cause greater unemployment problems for youth.
* Youth unemployment in developing countries is procyclical. More educated youth are less harmed by adverse business cycle and it is the poorest youth who are most adversely affected by adverse business cycles.

Employment rates: * There is no evidence that atypically large youth cohorts youth employment rates to fall.
* The employment rates are countercyclical, with the modest evidence that adverse impact is the greatest for the least educated.

Jobless rate: * There is evidence that the crowding from atypically large youth cohorts increases the jobless rate.
* The differences estimates suggest that youth joblessness is insensitive to changes in the adult unemployment (proxy for business cycle) rate overall.
* Labor force participation: Developing country youth in unusually large cohorts respond by increasing labor supply behavior compared to youth in smaller cohorts (10% growth in the relative size of the youth cohort results in 3.5% increase in the youth labor force participation rate.)
* A 10% increase in the growth of adult unemployment rate causes a 1% reduction in the growth of youth labor supply.

 Home Status: * Countries experiencing growth in relative size of their youth cohorts show decreasing home status rates across every demographic group (this might imply either rising labor supply, rising enrollment or both.)
* Home status[[16]](#footnote-16) is not found to be sensitive to business cycle.

Youth Enrollment: * A 10% increase in the relative size of the youth cohort causes a 7% reduction in the youth enrollment rate (effect is larger for female and rural youth.)
* Youth enrollment rates are not found to be sensitive to the business cycle.
 | Descriptive Statistics;Levels ordinary least squares(OLS) (93 countries) and differenced OLS (45 countries) with country fixed effectsDependent variables: Youth unemployment Rates, Youth Employment Rates, Youth Jobless Rates, Labor Force Participation Rates, Youth Home Status, Youth Enrollment Rates Explanatory Variables: Logarithm of relative size of the youth population(15-24) to the adult population (25 -49) (cohort size variable), Logarithm of the adult unemployment rate (proxy for business cycle) Controls: country fixed effects | **N/A** | The paper mostly presents descriptive statistics for youth employment outcomes across a heterogenous sample of countries. It presents a set of regressions of various outcomes on the size of cohort and a proxy for business cycle. However, it does not address the issue of youth job creation per se or relation between various policy or private sector outcomes and youth employment. | World Bank Microdata Development Data Platform (DDP) ; 93 countries; youth is defined as those between ages 15 and 24Adults are defined as 25 to 49.  | **N/A** | 93 countries for level regressions; 45 countries for difference regressions |
| **Betcherman, Olivas, Dar (2004)** | *Training programs for youth:* * Developed countries: these programs are almost always unsuccessful in improving labor market outcomes and it makes much more sense to invest earlier in the education system to reduce drop-outs and other schooling problems.
* Developing countries: While there are few studies in developing countries, evaluations in Latin America do find positive impacts for programs that integrate training with remedial education, job search assistance, and social services. This could be because abundant supplies of skilled workers are not readily available.
* Dar and Tzannatos (1999) concluded that youth training programs had the poorest track record, when compared with training programs for the long-term unemployed and those displaced through mass layoffs. OECD reviews have drawn a similar conclusion (Martin, 2000).
* The paper has reviewed 19 training programs for youth, with 14 being in the developed countries and 5 being in developing countries (all in Latin America). All five studies of youth training programs in developing countries appear to have had positive employment impacts and two of the three computing earning effects demonstrated positive impacts on that indicator.

*Employment services (*counseling, placement assistance, job matching, labor exchanges, etc) are:* found to generally have positive impacts on the post-program employment and earnings of participants and to have favorable cost-benefit ratio.
* are of limited use in situations where structural unemployment is high and there is lack of demand for labor.
* Are still of questionable use as far as their coverage and effectiveness goes in developing countries where many labor market transactions are informal.

*Training for the unemployed is* found to be beneficiary in terms of higher employment rates but not in terms of higher earnings. Look less effective in developing countries. Programs seem to work best with on the-job training and active employer involvement. Results are more positive for womenthan men.Retraining for workers in mass layoffs programs often have no positive impacts, with the exception of a few successful cases that typically include a comprehensive package of employment services to accompany the retraining.Wage/employment subsidies most often do not have a positive impact and have substantial deadweight and substitution costs. Targeting and monitoring may help but at the cost of reducing take-up rates.Public works programs have potential to be effective short-term safety net but they are not found to improve future labor market prospects for participants.*Micro-enterprise development/self-employment assistance* programs are found to have some positive impacts for older and better-educated workers, but the take up is low.  | Review of training programs and their evaluations. Depending on the program it could be an overview of the process evaluation, performance monitoring or impact evaluation. Both experimental and quasi experimental designs were used.  | **N/A** | * The findings are based primarily on OECD programs
* Many studies do not estimate the deadweight loss, substitution and displacement effects. Therefore, they cannot account for general equilibrium effects of the programs.
* The studies do not cover the long-term impacts of the programs.
* Many of the studies do not cover program costs so efficiency cannot always be estimated.
* From the studies it is known what did not work but it is not known why.
 | Based on overview of 159 program evaluations. * *Employment services:* 26 evaluations (19 in developed countries, 7 in developing and transition countries.)
* *Training for unemployed*: 49 evaluations (35 in developed countries, 14 in developing and transition countries.)
* *Training for unemployed after mass layoffs*: 9 evaluations (7 in developed countries, 2 in developing and transition countries.)
* *Training for youth:* 19 evaluations (14 in developed countries, 5 in developing and transition countries.)
* *Wage and Employment subsidies*: 23 evaluations (17 in developed, 6 in developing and transition countries.)
* *Public works programs:* 20 evaluations (8 in developed , 12 in developing countries.)
* *Microenterprise development and self employment assistance programs:* 13 evaluations (9 in developed, 4 in developing and transition countries.)
 | **N/A** | Global  |
| **Peacock, Simpson (2004)**  | * To avoid double counting and to have a meaningful “multiplier” for indirect jobs one has to take in account levels of demand,

unemployment, savings, and other factors. * Authors claim that the main reasons for why multipliers may be misleading and in fact overstating the impact of a sector on job creation are the following four simplifying assumptions:
1. Multipliers are based on the assumption of no divergence of demand from other sectors when demand in one sector is increased. Therefore they are not capturing the possible job destruction and thus relevant net employment creation.
2. Multipliers are based on the assumption that additional workers taken on by a new business were unemployed beforehand.
3. Multipliers do not take in account to what extent the inputs are sourced locally and to what extent the extra income is used on local purchases versus savings or imports.
4. Multipliers are based on averages while they are used to assess the effects of marginal changes and therefore they are likely to be overstating them.
* To improve the accuracy of the use of multipliers for prediction of total employment effects of increase in demand in one sector there should be:
1. An additional measure calculated for each sector (based on input-output tables) showing the extent to which the demand for its output is export-led.
2. A measure to factor in the availability of labor.
3. Correctly specified “leakages” as in for the type of the economy (small, open, etc) and sector what proportion of inputs is sourced locally and what proportion of additional income is spent locally instead of saved or spent on imports.
4. Caution and statement of the fact that marginal value is what we are looking for but averages are used so therefore it is likely that the effect is overstated.
* Both indirect (Type I) and induced (Type II) employment multipliers should be used only by comparison with other sectors, instead of being an absolute measure.
* Urges to use caution in the use of mutlipliers since if one was to apply them to all sectors in the economy the resulting employment would be more than existing employment.
 | A general overview of a few studies based on the input-output tables prepared by the Scottish Government. | **N/A [[17]](#footnote-17)**  | * Provides a good primer on how Type I (indirect) and Type II (induced) multipliers are calculated and used.
* Provides a note of caution on using the multipliers.
* It is possible that employment multipliers based on input-output tables have been revised in the latter years to take in account some of the problems above.
* Authors provide a discussion of what the problems are but do not estimate/quantify their severity.
* Authors provide general suggestions on how the problems can be addressed but do not provide technical implementation guidance/estimation on any of the additional measures suggested.
 | Studies using the input-output tables prepared by the Bank of Scotland, and the input-output tables themselves | **N/A** | Scotland  |
| **ILO Employment Trends Unit (2010)**  | Describes the methodology behind creation of indicators in the Key Indicators Labour Market Database (KILM) with the main focus on addressing the issue of the missing data.  | Two approaches to deal with missing data are presented: 1. Imputation methods for estimation in the presence of missing data
2. Indirect or small area estimation

Structures of missing data are addressed: 1. *Missing completely at random (MCAR)* – probability response (non-response) depends neither on the variable subject to non-response nor on any other variable.
2. *Missing at random (MAR) –* probability of response (non-response) does not depend on the variable subject to non-response but depends on other variables/observable characteristics. Once they are controlled for the probability of non-response is random.
3. *Not missing at random (NMAR)* – the probability of the variable missing depends on the nature of the variable itself and thus standard estimation methods cannot be applied.

Implicit and explicit imputation is considered and several imputation methods are reviewed. Global Employment Trends model is presented. It is based on Okun’s Law, according to which there is negative relationship between movements of the unemployment rate and changes in real GDP. Non-response pattern is identified judging by observable country characteristics and structure of missing data is identified as MAR. Weighted regressions are used for imputation when observations (total and subcomponent rates) are missing for some countries and some years. To control for heterogeneity underlying the data, panel data estimation techniques are used. Dependent variable: logistically transformed unemployment rate subcomponent Explanatory variable: annual rate of GDP growth for a given country, time dummies (in case of structural break), and other covariates. Controls: country fixed effects Weights: ratio between the proportion of non-missing observations in the sample and the reporting probability attached to each country in each year (estimated using logistic regression) Unemployment scenarios are created: **Scenario 1:** based historical relationship between economic growth and unemployment**Scenario 2:** based on the relationship between economic growth and unemployment during the worst observed economic downturn in each country. **Scenario 3:** based on taking the worst observed year-over-year increase in each country’s male and female unemployment and assumption that a slightly higher increase (by a multiple of 1.1) would happen simultaneously in all developed countreis, and that half of the largest observed increase would occur for developing economies in 2009. So it differentiates between developed and developing countries, assuming that impact of crisis on unemployment in the latter is less severe and lags the impact on the developed countries. Forecasting regression is developed.  | Key Indicators Labour Market Database (KILM) available at: <http://www.ilo.org/empelm/what/lang--en/WCMS_114240>The database contains the country-level information on the following 18 indicators from 1980 to the latest year available: 1. Labor force participation rate
2. Employment to population ratio
3. Status in employment
4. Employment by Sector
5. Employment by Occupation
6. Part –time workers
7. Hours of Work
8. Employment in the informal economy
9. Unemployment
10. Youth unemployment
11. Long-term unemployment
12. Time-related underemployment
13. Inactivity
14. Educational attainment and illiteracy
15. Average monthly wages
16. Hourly compensation costs
17. Labour productivity
18. Poverty, income distribution and working poor.
 | Describes the methodology behind creation of indicators in the Key Indicators Labour Market Database (KILM) with the main focus on addressing the issue of the missing data.  | When available data is taken from a Labour Force Survey (LFS) or a Household Survery (HS). If LFS or HS data is not available then data is taken from alternatively sources such as Population Census data (conditional on it conforming to ILO standards and guidelines.) * Youth labor force is defined as economically active population from 15 to 24.
* Adult labor force is defined as economically active population 25 and above.

Only national labour market data are included.  | **N/A** | Global  |
| **Sustainable Energy Department of the World Bank (2011)** | Reviews 33 studies in the energy sector and provides the reader with the focus, counterfactual, methodology, comments and ease of replication assessment for each. The authors also provide Type I and Type II employment multipliers from some of the studies. An evaluation study in energy sector with focus on employment can address the following four questions: 1. Estimating the incremental employment created by a specific project.
2. Evaluating the incremental employment effects of different forms of a stimulus program in which the energy sector is one possible recipient of government spending.
3. Evaluating the total employment supported by an energy sub-sector at a moment in time.
4. Comparing the employment creation of alternative energy technologies to achieve the same goal, whether it is the amount of power delivered or million dollars of expenditure.

It is important to distinguish between two different types of employment:1. Employment for construction, installation and manufacture (CIM)
2. Employment for operation and maintenance (O&M)

Important factors in ascertaining a project’s **direct employment** impacts are the degree to which manufacturing will be carried out domestically and the duration of the CIM and O&M jobs. Methodology to estimate **indirect and induced** employment: The input-output (IO) tables are used. However, up-to-date IO tables are available in high-income countries and in some developing countries. In cases of IO tables being unavailable one can use a well designed local survey and import employment multipliers from another country. For assessing **induced** employment impact the assumptions have to be made about the fraction of income that is spent versus saved as well as about what fraction of income is spent locally. To the extent unskilled workers tend to spend a higher fraction of income than skilled workers, programs that target investments with a higher proportion of unskilled workers will generate more induced employment. Main problems with multipliers derived from IO tables are that: 1. Sectors are not sufficiently disaggregated. For example, solar and wind power are typically not identified separately so that coefficients are not fully representative.
2. Models used are linear and are often out of date and do not allow for neither scale nor substitution effects to be accounted for.

**General concerns about current evaluations:** Counterfactual: Studies reviewed usually do not provide an appropriate counterfactual. Appropriate counterfactual might be alternative technology to produce the same output or a different use of the same total spending. Counterfactuals are particularly important in the case of a government spending programs when the analysis should not only evaluate alternative spending packages, but also the impacts of the opportunity costs of spending, through cutting spending elsewhere, raising taxes or borrowing. Studies that consider a counterfactual can indicate the number of net jobs that the project would create (or destroy) compared to a specified alternative. In some cases while gross impact might look impressive the net impact when compared to the alternative might be less positive (as in **Grover 2007** study that compares targets of Solar America Initiative to the alternative of providing the same amount of electricity generation through new gas fire plants, gross impact of solar production was 49,370 direct, indirect and induced jobs created by 2015, but net impact was only 15,580 jobs by 2015 with direct net employment becoming negative.) Neither of the studies reviewed have compared projects costing the same amount on both employment and output metrics, or compared projects producing the same output on both employment and cost metrics. Other concerns: * *Impact on the household budget* for consumers is a relatively overlooked aspect in the analysis of energy investments. However it is an important point as energy efficiency products may save households money, while the projects that increase the cost of energy to the user (e.g. mandates for renewable generation) will result in reduced household budget for other goods.
* When one or more project alternatives to be financed through increased public expenditure or subsidies, the employment impacts should be adjusted for negative induced effects of tax policies to maintain *budget neutrality.*
* It also points out that evaluators should keep in mind that this is a *change* *in* and not the *leve*l of employment that if of interest.
* *Actual impacts* on employment – as opposed to estimated potential impacts- will depend not only on the types of projects and policies under consideration, but also on how labor markets may adjust to implementation of these projects and policies.
* *Constraints on worker availability* should be also considered.
 | Review 33 studies in the energy sector and provides the reader with the focus, counterfactual, methodology, comments and ease of replication assessment for each.For detailed review see pages 59-72 of the paper.  | Verso Economics(2011): UK: Renewable energy sector: TypeI 4.7CH2MHILL 2009 US: (industry-typeI-typeII)Solar plant CIM- 2.8-3.5Solar plant O&M-1-1.4Pfeifenberger et al 2010 US: (industry-typeI-typeII) Wind energy: transmission component -1.3-1.7Wind energy: wind component CIM 1 year – 7.1-9.4Wind energy: wind component O&M -2.5-3.8Labovitz School of Business 2010 US: (industry-typeI-typeII)Construction of transmission line – 1.42-1.99ECF 2010 Hungary: Job creation over 10 years(industry-typeI –typeII-direct) Building renovation base case – 1.3-1.3-8,000Building renovation (deep retrofitting) -1.3-1.5-91,000National Biofuels Task Job creation between 2006 and 2013 projected, no distinction between CIM and O&M, or part time versus full time jobs2006 South Africa: (industry – typeII-direct) Biofuels E10 – 4.2- 11025Biofuels B2- 10.68-732Polin, Heintz, Garret 2009 jobs per $ million investedUS: (Industry- type I- type II - direct)Oil & natural gas – 4.63-7.50 -0.8Coal- 2.58-4.63-1.9Building retrofits – 1.7-3.39-7.0Mass transit – 1.45-3.03-11 Smart grid – 2.07-3.91-4.3Wind – 2.07-3.89 -4.6Solar- 1.81-3.54-5.4Biomass – 1.68-3.35-7.4Pollin, Garett-PeltierJobs per $billion spent2009 (industry-TypeI –TypeII-direct jobs) Military- 1.25-1.63-7100Clean energy-1.63-2.28-7500Health care-1.35-1.88-10,400Education -1.23-1.72-16,900PricewaterhouseCoopers Snapshot of job creation by oil and gas sector for both state and national level in 2007Published in 2009: (sector – TypeII –direct jobs) Oil & Gas sector-3.68-2,123,291 jobs  | * A thorough overview of what has been done in terms of evaluations that either focus on or include job creation as one of the metrics for projects and policies in energy sector.
* Provides a very good guide to how evaluations should be done and what the weak points of the existing ones are.
 | N/A | **Energy**  | Global  |
| **California Economic Strategy Panel(2009)**  | Regional level multipliers are higher for regions with a diverse industry mix. Multipliers also depend on how extensively industries use local materials versus obtaining them from outside of the region. Multipliers tend to be higher for industries located in urban areas because more of the spending by the industry stays within the area. Multipliers do not always measure economic impacts correctly (with a tendency to overstate the impact) because: 1. It is assumed that trading patterns are fixed (eg new firms will buy from local industries in the same proportion as existing firms in the area; and local suppliers are able to increase their output to supply the new firms.)
	1. Incoming firms are not always a net new source of economic activity and in fact they can take business away from existing firms
2. Due to often-varying relationship between industries the indirect economic impacts indicates by multipliers may not occur
 | Presents regional input-output multipliers (RIMS II) for California developed by the U.S. Bureau of Economic Analysis and measure the impact of a change in final demand, in earnings, or in employment on a region’s economy.  | There are two sets of multipliers for 60 aggregated and 473 detailed industries: 1. Based on more recent but less detailed national annual input-output data (2006)
2. Based on more detailed but less current national benchmark input-output data 1997-2006

More recent estimates and estimates from other states can be purchased from: http://www.bea.gov/regional/rims/ | * Present basic ideas behind the interpretation and limitation of multipliers.
* Ignores other limitations such as linear production functions behind IO tables, which does not allow for scale and substitution effects.
* Additionally does not address general equilibrium effects or assumptions that are behind spending and saving behavior for estimation of induced impact.
 | Data from Bureau of Economic Analysis | **60 aggregated****473 detailed industries** | California, USA  |
| **American Chemistry Council (2011)**  | Report presents impact of a 25% increase in ethane supply (this will mean $16.2 billion investment in processing capacity) on growth in the petrochemical sector. This increase was found to generate: * 17,000 new knowledge-intensive, high-paying jobs in the US chemical industry
* 395,000 additional jobs outside the chemical industry (165,000 jobs in other industries that are related to the increase in US chemical production and 230,000 jobs from new capital investment by the chemical industry)
* $4.4 billion more in federal, state, and local tax revenue, annually ($43.9 billion over 10 years)
* A $32.8 billion increase in US chemical production
* $16.2 billion in capital investment by the chemical industry to build new petrochemical and derivates capacity
* $132.4 billion in US economic output ($83.4 billion related to increased chemical production (including additional supplier and induced impacts) plus $49.0 billion related to capital investment by the US chemical industry.)

The higher competitiveness of the sectors due to increased production of petrochemicals is mentioned but not separately examined due to model limitations. Highlights how the petrochemical sector in the United States was hurt by the policies that have increased demand for the natural gas without addressing the supply side.  | IMPLAN model that includes detailed information on more than 440 industries was used. It was adjusted to avoid double counting the impact of increased petrochemical and intermediate organic chemical demand. In addition, spending for oil and gas production and related services was excluded. The effects of possibly changing prices in petrochemical and other industries in response to the supply increase are also not captured in the model.The analysis was broken down into two parts: 1. The one-time change in final demand that occurs during the initial capital investment phase when new plant and equipment are purchased
2. The ongoing change in final demand that occurs with a 25% increase in ethane production in the United States

Effects on added output, jobs, and tax revenues from the new investment spending were assumed to be a one-time impact and were modeled as such. Time horizon of 3 years is assumed for job creation impacts (thus I believe the impacts estimated are these over 3 years.) Time horizon of 10 years is assumed for assessing tax impacts. It is assumed that additional ethane supply will be consumed domestically by petrochemical sector to produce ethylene (reasoning: ethane is difficult to transport so therefore it is unlikely that majority of ethane will be exported.)Production of ethylene and downstream plastic resins would increase at a similar rate as ethane production (reasoning: 99% of ethane supply goes into ethylene production and 82% of ethylene goes into plastic resins, so this assumption might be quite reasonable.) Investment needed in the petrochemical industry to process 25% increase in ethane production was deduced based on estimated capital-output ratio of 0.49:1 (meaning for $1 billion in added petrochemical and derivative output $490 million of new capital investment is needed.) Estimated capital investment was limited to chemical sector and did NOT include the investment or business activity generated by extraction, recovery or infrastructure related to delivery of the ethane to chemical plants. It also did not include the effects from investment in development and production of shale gas nor pipeline and other infrastructure development.The composition by asset type for this capital investment was derived using the average historical mix for the chemical industry’s expenditures for fixed asset. Estimates of effect on taxes are calculated for a 10-year period assuming historical tax buoyancy.The needed $16.2 billion investment needed for increased processing capacity is assumed to come from the private sector.  | Detailed tables are available in the paper.**Economic impact from Expanded production of Petrochemical and Derivatives from a 25% Increase in Ethane Production (change in output):** Direct effect – 17,017 jobs (estimated $2.4 billion addition to payroll) Indirect effect – 79,870 (estimated $6.6 billion addition to payroll) Induced effect – 85,563 (estimated $4.1 billion addition to payroll) Total effect 182,450 (estimated $13.1 billion addition to payroll) This results in Type I multiplier=5.7 and Type II multiplier=10.7Industries with highest total job gains: 1) services 2) trade 3) nondurable manufacturing 4) finance, insurance and real estate**Economic impact from New Investment in Plant and Equipment (change in investment):**Direct effect – 54,094 (estimated $4.3 billion addition to payroll) Indirect effect – 74,479 (estimated $5.1 billion addition to payroll) Induced effect – 100, 549 (estimated $4.8 billion addition to payroll) Total effects – 229, 122 (estimated $14.2 billion addition to payroll) Industries with most This results in Type I multiplier=2.38 and Type II multiplier=4.24Direct jobs generated are concentrated mostly in construction and capital equipment producing industries. Industries with highest total job gains: 1) services 2) durable manufacturing 3) trade 4) finance, insurance and real estateEstimates of impact on tax revenues are also presented (please see methodology for more information)  | * Presents a good overview of the development and competitiveness of US petrochemical industry in particular with respect to natural gas products.
* While assessing the impacts the paper doesn’t state that projected increase might just be an upper bound on the estimate.
* There is no counterfactual presented.
* Also vague about the time horizon of the jobs being created and does not seem to differentiate between the CIM and O&M type of jobs.
* According to the authors the analysis does not capture any additional activity that could be generated if methanol and ammonia production were to return or increase to prior levels due to prior levels due to the increased availability of natural gas.
* The effects of possibly changing prices in response to the supply increases are also not captured in the model.
* General equilibrium effects are not taken into account, which is mentioned by the authors.
 | Since the investment needed to process 25% increase in ethane production was not included in the model it had to be deducted by using capital-output ratios based from *Quarterly Financial Report* prepared by US Census Bureau, fixed asset and industry data from Bureau of Economic Analysis (BEA), and the *Corporation Sourcebook* prepared by the Statistics of Income Division of the Internal Revenue Service. Fixed asset data from BEA used for composition of the investment | **Petrochemicals** | U.S.A.  |
| **Klapper, Amit, Guillen, Quesada (2007)** | * This study offers a methodology for collecting data on new business creation, serving as a first step in enabling research on dynamics of entrepreneurial activity.
* Business entry and density rates are significantly related to country-level indicators of economic development and growth, the quality of legal and regulatory environment, ease of access to finance, and prevalence of informality.
* The direction of causality is unclear i.e. whether positive economic growth is a determinant for the creation (i.e. registration) of new businesses or whether greater entrepreneurship leads to economic growth and innovation.
* Government corruption and enforcement is the driving force in decision of entrepreneurs to join the formal sector.
* Entry per capita is significantly related to the number of entry procedures, access to finance, and economic development.
* Business density is strongly and significantly related to lower barriers to entry and better governance.
 | Random effects generalized least squares (GLS) Population-averaged Generalized Estimating Equations (GEE) Dependent variables: Business density -- number of businesses per 1000 people in the active population. Entry rates -- new registrations of companies as a percentage of total lagged (previous year) registered businesses. Entry per capita – new firms as a percentage of the active population. Explanatory variables (Panel analysis): Entry procedures, rigidity of employment, governance, domestic credit (%GDP), GDP per capitaControls: Year trend (for GEE)  | See Table 3 in the paper.  | Provides a connection between various reforms and entry of firms into the formal sector (this however captures not only firm creation but just a switch from informal to formal sector.) Assuming that new firms create jobs this provides a connection between various country factors such as access to finance and ease of doing business and job creation. However, these findings have to be interpreted carefully as it is unclear which percentage of the firms entering the formal sector are actually new and thus assuming all of them are will lead to an overestimation of potential job creation. The size of the firms is also not accounted for so it is unclear if they are bigger or smaller as judging by the size one could see if the firm is a new one or if it is just becoming formal. Lastly the longevity of the firms is also not controlled for so while we can extrapolate some facts about job creation we cannot actually say anything about the quality or duration of the jobs. As stated by the authors the direction of causality is unclear i.e. whether positive economic growth is a determinant for the creation (i.e. registration) of new businesses or whether greater entrepreneurship leads to economic growth and innovation.  | Sample for the analysis is a pooled, cross-sectional, longitudinal unbalanced panel of 197 observations across 76 countries with non-missing explanatory variables for 2003, 2004, and 2005. Dependent variables: Entrepreneurship database available at: http://www.ifc.org/ifcext/sme.nsf/Content/ResourcesCollected from business registries and other government sources via a survey and follow-up phone calls. Additional sources: statistical agencies, tax and labor agencies, chambers of commerce, and private vendors, which were used only when business registry data were unavailable or non-existent. 84 countries: data on total number of registered businesses 82 countries: number of new businesses, defined as businesses registered in the current year. All data used in the analysis are averages from 2003 to 2005. Explanatory variables: Doing Business Report  | **Finance** | Global  |
| **Bruhn, Love (2009)**  | * New bank opening led to an increase in the proportion of informal businesses by 7.6 percent, but no change in formal.
* Higher proportion of women working as wage-earners in municipalities with Azteca branches after its opening.
* Increase in informal businesses is only significant for men.
* Total employment, including informal business owners and wage earners, rose by 1.4 percent for the complete sample.
* The new bank opening led to higher income levels for both men and women by about 7 percent.
 | Exploit cross-municipality cross-time variation in Azteca branches.Difference-in-difference estimator that compares municipalities with and without Banco Azteca before and after Banco Azteca opening.Dependent variables: Level and changes in: informal business ownership, formal business ownership, employment, people above minimum wage, log monthly income. Explanatory variables: Dummy for the presence of Azteca, which is an interaction between post third quarter 2002 dummy and dummy that takes on the value of 1 if in fourth quarter 2002 municipality had at least one Azteca branch and zero otherwise Controls: Municipality fixed effects Quarter fixed effects*Standard errors* are clustered at municipality level.  | See detailed tables in the paper (Tables 2 – 5)* New bank opening led to an increase in the proportion of informal businesses by 7.6 percent, but no change in formal.
* Higher proportion of women working as wage-earners in municipalities with Azteca branches after its opening.
* Increase in informal businesses is only significant for men.
* Total employment, including informal business owners and wage earners, rose by 1.4 percent for the complete sample.
* The new bank opening led to higher income levels for both men and women by about 7 percent.
 | The study exploits cross-municipality cross-time variation in Azteca branches to assess a relationship between providing access to finance and job creation and income.The study does not establish whether the new bank opening had a direct impact, which it might have had given its large scale of the operations, or an indirect one - i.e. via improvement in the competition in the local financial sector. Authors point out that the impact on economic outcomes observed could have stemmed from access to credit and savings provided by Azteca, or by a number of other financial institutions. Thus it is safer to say that the evidence suggests that improving access to low income households has a significant impact on the labor market and income levels.  | Mexican National Employment Survey (ENE) (sample limited to those 20-65 years old) Presence of Banco Azteca branch is taken from the Comision Nacional Bancaria y de Valores (CNBV)Final sample has 576 municipalities, 249 of which had Azteca branch, 327 did not have Azteca but had other bank branch. Only 6 municipalities had Azteca as only bank.  | **Finance** | Mexico |
| **Kapstein, Kim (2010) Indonesia** | * Snapshot study of economic impact of Standard Chartered in Indonesia in 2009. Does not track developments over time and does not try to assess impact of Standard Chartered versus other financing institutions in Indonesia.
* Report is focused on the activities of Standard Chartered and PT Bank Permata (44.5% of which is owned by Standard Chartered.)
* Direct and indirect impact in terms of value added and employment effect is broken down into (i) the one produced by the bank itself as it hires workers, pays, taxes etc and its suppliers (ii) the one produced by clients financed by the bank and their suppliers.

Direct impact in is broken down into: 1. value added due to spending as the bank hires workers, pay taxes, etc ($281 million in 2009)
2. value added due to spending by clients financed by the bank (when added total value added is $2,065 million)

Indirect impact: 1. value added by suppliers of Standard Chartered
2. valued added by the supplies of clients financed by the bank

Total value added (direct, indirect and induced) is $4,504 million, which is 0.8% of Indonesian GDP.Employment effect: Direct employment by Standard Chartered: 4,492 jobs in 2009 (total employment) Total direct, indirect and induced effect of operations by Standard Chartered: 67,000 jobs (total employment) Direct employment by clients of Standard Chartered: 187, 000 employed as a result of financingTotal employment (direct, indirect, induced): 962,000 jobs  The bank’s total impact of 1,029,000 jobs amounted to 0.9% in 2009. | Social Accounting Matrix (SAM) To be prudent in estimation of impacts only 44.5% of Permata’s Bank employment and value added is attributed to Standard Chartered. Similarly bank’s clients’ employment and value added are prorated according to the percentage that they are financed by Standard Chartered. | Table 3 and Table 4 represent the value added and employment associated with $1 million of financing by Standard Chartered and Permata by client segment and economic sector. SME – 359 jobsCommodity Trade & Agriculture (CTA) – 521 Global Corporates (GC) – 272 Local Cororates (LC) – 396 Consumer Loans- 242**Weighted Average by client Segment – 327** Agriculture – 2,954 Mining – 62 Manufacturing – 171 Utilities – 79 Construction- 61 Trade – 497 Transport and Communications – 279 Business Services – 106 Social and Public Services – 333Housing -80 **Weighted Average by economic sector – 327**  | * Provides a good macro-perspective on a single firm’s operations.
* Authors emphasize that there is really no counterfactual in this case and the role of Standard Chartered could have been filled by other lending institutions.
* Contributions of Standard Chartered to Indonesian economy through facilitation of offshore financing are not accounted for.
* SAM is not designed to take in account substitution, scale and price effects.
* IO tables are not updated frequently and thus technological change is usually not taken into account.
* Authors also mention that in countries with a substantial percentage of agricultural production (eg 42% of Indonesian labor force is in agriculture) the induced effects can be overstated because of auto-consumption, so they have had to eliminate from the model all household expenditures on food crops and live stock to partially correct for it.
* Linear relationship is assumed between financing and revenues for attribution purposes, which might be a rather strong assumption.
* There is also an assumption of foreign and domestic investment having the same productivity.
 | 2009 fiscal year data  | **Finance** | Indonesia |
| **Kapstein, Kim (2010) Ghana**  | * Snapshot study of economic impact of Standard Chartered in Ghana in 2009. Does not track developments over time and does not try to assess impact of Standard Chartered versus other financing institutions in Ghana.
* In addition to economic impact the study also assesses Standard Chartered Ghana’s effort to build a sustainable business in Ghana.
* Direct and indirect impact in terms of value added and employment effect is broken down into (i) the one produced by the bank itself as it hires workers, pays, taxes etc and its suppliers (ii) the one produced by clients financed by the bank and their suppliers.
* The total value added of Standard Chartered in Ghana in 2009 (includes direct, indirect, induced) value added amounts to $400 million or about 2.6% of Ghana’s GDP.
* Standard Chartered Ghana’s biggest impact (78%) comes from its financing of companies and not from its own operations (22%).
* About 56% of the total value-added impact is created directly – either by Standard Chartered Ghana’s own operations (14%) or by the recipients of Standard Chartered Ghana financing (42%).
* According to Standard Chartered Ghana’s financial data, only $23 million of the $108 million are taxes paid directly by the bank (corporate taxes, VAT and employment taxes), reflecting the fact that the bulk of a bank’s economic impact stems from enabling other companies to create value-added and thereby pay taxes.
* According to its 2009 annual report, Standard Chartered Ghana employs about 800 people in Ghana, but its operations generate a total of 15,400 jobs when the indirect and induced employment effects are taken into account. In the same way, the bank’s clients employ 30,500 directly as a result of its onshore financing, but a total of 140,300 jobs are created when indirect and induced effects of the financing are included, relative to Ghana’s total workforce of 10.3 million (see table 1), the total impact of the bank’s operations and onshore lending, almost 156,000 jobs, amounts to 1.5%.
 | * Social Accounting Matrix (SAM)
* To be prudent in estimation of impacts only 44.5% of Permata’s Bank employment and value added is attributed to Standard Chartered. Similarly bank’s clients’ employment and value added are prorated according to the percentage that they are financed by Standard Chartered.
 | Table 3 and Table 4 represent the value added and employment associated with $1 million of financing by Standard Chartered by client segment and economic sector. By client segment: Small & Medium-sized Enterprises - $3.78 million value added – 1,715 jobs created Commodity Traders & Agriculture - $1.27 million value added – 570 jobs created Global Corporates - $1.04 million value added – 544 jobs created Local Corporates - $1.17 million value added – 483 jobs created Consumer loans - $0.51 million value added – 223 jobs created **Weighted Average - $1.13 million value added – 509 jobs created** By economic sector: Agriculture - $6.54 million – 6,831 jobs created Forestry and Fishing - $1.66 million – 1,098 jobs created Extraction – $1.05 million – 40 jobs created Manufacturing - $0.81 million – 261 jobs created Utilities and construction -- $1.32 million – 79 jobs created Trade- $1.72 million – 1,456 jobs created Transport and Communication - $1.02 -321 jobs created Financial Services - $2.23 million – 284 jobs created Social and Public Services -- $2.03 million – 1,312 jobs created **Weighted Average -- $2.04 million – 1,298 jobs created**  | The report represents a good snapshot of contributions of one firm at the macro level. Authors emphasize that there is really no counterfactual in this case and the role of Standard Chartered could have been filled by other lending institutions. Contributions of Standard Chartered to Ghanaian economy through facilitation of offshore financing and trade are not accounted for. SAM is inherently a static model and thus is not designed to take in account substitution, scale and price effects. The model depends on the assumption that an increase in demand can be met by an increase in production at constant prices for all affected sectors of the economy, which might not hold true due to shortages in labor, raw materials, and production capacity. IO tables are not updated frequently (even though authors do not state the year from which the IO table came) and thus technological change is usually not taken into account.Authors also mention that in countries with a substantial percentage of agricultural production (eg 56% of Ghanaian labor force is in agriculture) the induced effects can be overstated because of auto-consumption, so they have had to eliminate from the model all household expenditures on food crops and live stock to partially correct for it. Linear relationship is assumed between financing and revenues for attribution purposes, which might be a rather strong assumption. There is also an assumption of foreign and domestic investment having the same productivity, which according to the authors have been doubted by many economists.  | * 2009 fiscal year data
* National statistic data from Ghanaian government
 | **Finance** | Ghana |
| **Kapstein, Kim (2011)**  | NGGL is a major contributor to Ghana's economy, generating nearly 10% of the nation's total exports; 4.5% of its total foreign direct investment and 1.3% of GDP2. NGGL directly and indirectly produces some 48,000 jobs in Ghana;3. NGGL has played a significant developmental role in the communities around the Ahafo mine, and in 2009 alone it provided 99 local companies with nearly USD$ 6 million in contracts, supporting more than 400 jobs, not including direct mine employment.As can be seen, for each job within NGGL, 2.8 jobs are created elsewhere in the direct value chain, implying a job multiplier of 3.8. The number of jobs created indirectly (i.e. by NGGL's suppliers and by the suppliers' suppliers) and are induced by household consumption decisions are 28.9 and 12.5 thousand respectively, for a total of nearly 50,000 jobs, or a multiplier of 28x relative to Newmont’s own employment.[[18]](#footnote-18) The majority of jobs provided by NGGL are in manufacturing, services, trade (including hotel and catering service) and obviously NGGL itself. The large indirect impact in agriculture and trade is in part due to their high informality and low productivity.Report provides value added per employee depending on the sector. The lowest value added per employee is in agriculture and trade reflecting the low productivity of these sectors in Ghana. Female Employment: Women occupy 196 (11.2%) of all jobs in NGGL. The most common occupation that these women have is heavy mobile equipment operator, including haul trucks; 30 out of 134 haul truck operators are female. Women’s average monthly salary of USD $98613 is 14% higher than the male average salary, reflecting that on average they hold positions that require more skills.Skill training: In 2009 the company spent USD $3.2 million on training, and on average each worker had 150 hours of skill training; between 2007 and 2009 more than USD $8 million was spent on some 380,000 man hours of training, including a major apprenticeship program. A wide variety of training courses are offered, reflecting the various skills needed to run the mine. They included office skills like computer technology, and mine-specific skills including mine operations and maintenance.Report provides estimates of the success of the Afaho Linkages program that is cosponsored by IFC and is focusing on establishing and maintaining procurement standards (focusing on developing local suppliers), supporting and promoting business associations and on skills training among other things. According to 2009 data Afaho Linkages program had supported 99 companies and created 439 mostly skilled jobs (330 skilled, 109 unskilled).  | Social Accounting Matrix (SAM) 2008 data  | **Value added per job associated with NGGL:** NGGL – 31.72 thousand USDUtilities & Construction – 19.30 thousand USD Mining- 14.37 thousand USD Services – 5.65 thousand USD Trans & Communications – 2.97 thousand USD Manufacturing – 2.7 thousand USD Trade- 1.03 thousand USD Agriculture, Forestry, Fisheries <1.03 thousand USD **Jobs provided associated with NGGL in thousands:** NGGL – 1.7 Agriculture – 10.1 (0.2 NGGL value chain, 8 indirect, 1.9 induced) Mining -0.1 Manufacturing – 10.5 (2.3 NGGL value chain, 4.6 indirect, 3.7 induced) Utilities & Consumption – 1.1 (around 0.3 NGGL value chain, 0.7 indirect) Services – 6.1 (1.0 NGGL value chain, 1.8 indirect, 3.3 – induced) Transport and Communications – 2.6 (0.2 NGGL value chain, 1.8 indirect, 0.6 induced) Trade – 15.8 ( 1.1 NGGL value chain, 11.9 indirect, 2.8 induced)  | Authors warn that the company's job multiplier can be increased by outsourcing activities or by procuring from less productive firms, although no value added is necessarily being created by generating employment in this way.Due to the nature of the mining sector majority of the jobs provided are in the informal sector.  | 2009 fiscal year data National statistic data from Ghanaian government  | **Mining** | Ghana  |
| **Bagues, Labini (2008)** | * Participation in AlmaLaurea (an online job search intermediary) reduces the probability of unemployme**nt by 1.6 percentage points;**
* **Participation in AlmaLaurea** has a positive effect on wages and self-reporte**d measures of job satisfaction, which indicates increase in matching productivity;**
* It also fosters graduates geographical mobility.
 | Difference in differences (DID) approach on repeated cross-sectionRobustness of results is checked by the creation of alternative treatment and control groups to assesses it results could have been attributed to time varying omitted characteristics and to biases of random variation occurring in a single setting.Dependent variables: Occupational status (1 if an individual if unemployed, and 0 otherwise); Regional mobility (1 if an individual resides in a different region from where she graduated, 0 otherwise); Wage (net monthly wage expressed in euros and self reported by the interviewed) Perceived level of adequacy of the knowledge acquired at university with respect to the content of the present job; Perceived stability of the job. Expanatory variables: University’s participation in AlmaLaurea in 1996 or 1997Controls: Gender, age, high school grade, university grade, students per faculty, share of delayed students, GDP, provincial unemployment, dummies on a year delay, dummies on month of graduation | * Monthly wages increased by about 44 euros for AlmaLaurea graduates compared to the control group (when no controls are used)
* Depending on the controls used participation in AlmaLaurea has a positive and statistically significant effect on mobility ranging from 2.3 to 2.8 points.
* Participation in AlmaLaurea increases wages by about 3%.
 | * Provides an estimation of the effect of online intermediation in the university-to-job transition, which is an important question in youth employment area.
* Since universities enroll in Almalaurea at once then it is possible that the authors are measuring the effect on university versus an individual. They propose for future research an investigation of the possibility of within university spillovers.
* Difference-in-differences approach assumes no interactions between agents in treatment and control groups.
* Authors also do not have the direct evidence on the extent to which AlmaLaurea crowded out other search channels
 | Merged two almost identical surveys – Indagine Inserimento Professionale Laureati (Survey on University-to-Work Transition) run in 1998 and 2001 by the Italian Statistical Office (ISTAT) on representative samples of two cohorts of university graduates interviewed three years after graduation. Split into two distinct groups: 1. graduates that completed their degree in a university that joined AlmaLaurea in 1996 and 1997 (the treatment group)
2. graduates from universities that were not members of AlmaLaurea during that period (control group)
 | **Education/Job Search** | Italy  |
| **Muravyev, Talavera, Schafer (2009)**  | * There is some evidence that compared to male-managed counterparts, female-managed firms are about 5% less likely to receive a loan.
* The analysis suggests that female entrepreneurs are charged higher interest rates (about 0.5 percentage points more) when loan applications are approved.[[19]](#footnote-19)
* There is some evidence that gender-based discrimination is lower in countries with more developed financial markets (as reflected in lower rejection rates, lower collateral requirements.) Thus consistent with economic theory discrimination is observed to vanish when there is more competition among suppliers of finance.
 | Ordinary Least Squares Regression (initial), instrument variableBinary Response Model Dependent variables: Loan approvals, interest rates charged, collateral required. Explanatory variables: profitability, capacity utilization, diversification, multiple establishments, membership in a business association, dummy for using International Accounting Standards, dummy for employing an external auditor, dummy for a firm being net exporter, dummy for a firm having four or more competitors, dummy for being located in a large city (more than 1 million inhabitants), dummy for being located in a rural area, dummy for receiving loans in foreign currency, term of a loan measured in months.  | See Table 6 in the paper* There is some evidence that compared to male-managed counterparts, female-managed firms are about 5% less likely to receive a loan.
* The analysis suggests that female entrepreneurs are charged higher interest rates (about 0.5 percentage points more) when loan applications are approved.
 | * Provides an insight into the obstacle for female self-employment and entrepreneurship
* There is some concern that the findings might be biased due to omitted variables as the banks do not provide all the relevant information to BEEPS.
* There might be self-selection into entrepreneurship that is not gender-neutral and this might result into issues with identification due to sample selection.
 | Business Environment and Enterprise Performance Survey (BEEPS) implemented by European Bank for Reconstruction and Development (EBRD) and the World Bank. Implemented in 34 countries (mostly Central and Eastern Europe and Central Asia (26 post Soviet countries), some Western Europe and Asia)14,108 firms (typically 300-600) | **Finance** | Global  |
| **Kapstein, Kim (2011)** | * Authors argue that careful, quantitative analysis of stakeholder relationships can provide a useful complement to the strategy building exercise happening at most multinational corporations.
* The greater the impact of a firm’s sourcing decisions on local economies, the more constituents the firm will develop in support of its strategic goals.
 | Overview of case studies: Nile Breweries in Uganda, Newmont Mining Corporation in Ghana, Standard Chartered Bank in Ghana, Heineken International in Sierra Leone, Rwanda, and Nigeria  | N/A | * Provides some evidence in favor of assessing social and economic impacts on the community a company operates in addition to the usual considerations while deriving company’s strategy.
* Encourages use of Input-Output tables for quantitative analysis of firm’s impacts on the community. Usual concerns with the Input Output tables apply.
 | N/A | **multiple** | Global  |
| **Bruhn, Karlan, Schoar (2010)** | Authors highlight that managerial capital has traditionally been overlooked in theories and studies of impediments to firm’s growth. Authors propose incorporating managerial capital into the intercept shifter of standard Solow production function. Managerial capital can affect firm’s performance in at least two ways: * better managerial inputs are able to improve the marginal productivity of their other inputs
* managerial inputs effect the amount and the type of physical and labor inputs that a firm buys or rents (thus resource constraints are a function of managerial capital)
 | Review empirical and theoretical papers addressing managerial capital. Among them are Azam Choudry (2003), Nicholas Bloom and John Van Reened (2010), Karlan and Martin Valdivia (2011), Alejandro Drexler, Greg Fischer, an Schoar (2010), Bruhn, Karlan, and Schoar (2010), De Mel, McKenzie, and Woodruff (2008 Sri Lanka), McKenzie and Woodruff (2008 Mexico), Udry and Santosh Anagol (2006).  | N/A | * Provides potential link between managerial capital and firm growth and employment. Thus there might be a link between managerial training and job creation.
* As authors highlight it is hard to establish the link through evaluations of training programs as even if managerial training is a hindrance to growth there might be no results just because the program was not effective in teaching those skills.
* Lastly it is possible that managerial skills are innate and are impossible to teach.
 | N/A | **N/A** | Global  |
| **Oosterhaven, Stelder (2002)**  | * Highlights the fact that often times if one was to add up the predicted effects when multipliers from IO tables are used the total employment, output and value added will be larger than the economy as a whole. The reason for this is double counting that results from the fact that linkages do not imply causality and Intput-Output tables are based on Leontieff model, where only change in final demand unambiguously causes changes in inputs and employment.
* Proposes a ***net multiplier*** for output, value-added and employment that utilizes information only from changes in output that are unambiguously exogenous.
* As an example uses Dutch transportation industry as a case study and shows that while net multipliers are generally smaller than standard ones they do add up to the correct size of the economy.
 | Case study of Dutch transportation industry and use of Input-Output matrices using the Interregional Input-Output Software (IRIOS) package of the University of Groningen ([www.REGroningen.nl](http://www.REGroningen.nl))  | Estimates of multipliers for Dutch transportation sector derived in a standard way (gross multipliers) are presented in Table 1. Estimates of multipliers for Dutch transportation sector derived based on the concept of net multiplier are presented in Table 2. While net multipliers are smaller than gross multipliers, they do add up to the correct size of the economy.  | * Highlights a possibility of double counting and overstatement of each sectors effect that can stem from the use of employment and value added multipliers.
* Proposes a net multiplier approach that allows avoiding this double counting. However, it does not seem to have become popular among the practitioners
 | Data from bi-regional input-output tables for the North and the Rest of the Netherlands (derived from RUG/CBS,1999, and Eding et al 1999[[20]](#footnote-20)).  | **Transportation/Infrastructure**  | Netherlands  |
| **Domanski, Gwosdz (2010)**  | * Presents an overview of main theories behind multiplier effects (economic base theory, input-output model, growth pole theory) highlighting their strengths and weaknesses.
* Presents overview of main methods of measuring multiplier effects: 1) an aggregate method and 2) an incremental method, - identifying the incremental one as a proper one.
* Most popular tools to calculate the effects are RIMS II, IMPLAN and REMI. While the first two are based on Leontieff Input-Output matrices, REMI (Regional Economic Model) is known as an eclectic one as it combines input-output matrix with Cobb-Douglas production function.
* While IMPLAN and RIMS II produce estimates that are higher than those derived by REMI it was shown that difference is not statistically significant.
* Presents overview of a few of empirical studies of local and regional multiplier effects.
* Identifies further need for theoretical and empirical work to develop multipliers that go beyond estimation of short term effects, account for spatial characteristics and the type of activity. Additionally highlights the need for research to identify which factors attract or repel different types of economic activity to cities and regions.
 | Review of economic theory behind multipliers, methods of measuring them and available tools to do so. Review of a few empirical studies of regional and local multiplier effects. The studies include: Isard and Kuenne (1953), Mulkey & Hodges (2003), Harris et al. (2003), Wiedermann (2006), Barford (1938), Isard and Kuenne (1953), Domanski (2001 | N/A | * Presents overview of a few of empirical studies of local and regional multiplier effects.
* Reviews theories, methodologies and tools for calculating multiplier effects.
* Identifies further need for theoretical and empirical work to develop multipliers that go beyond estimation of short term effects, account for spatial characteristics and the type of activity. Additionally highlights the need for research to identify which factors attract or repel different types of economics activity to cities and regions. However, does not propose any solution to the problems identified.
 | N/A | **N/A** | Global  |
| **FAO/EBRD (2011)**  | * Job creation by modern retailers in the region exceeds job destruction by traditional shops (net positive effect.)
* Introducing a super market like Walmart significantly increased retail jobs in the short run (+100), but over time about half of these jobs were lost again in competitors, still leaving a significant addition in jobs.
* Most affected were generalist stores, less so specialized stores.
* At least some of the stores were converted to different types of businesses.
* It's difficult to assess impacts: In an Indonesian study trying to control for effects on traditional stores (by choosing closeby shops as "treatment" and far-away stores as "control" group, both were losing business, and there was no significant difference between the two.)
* The main gender effect from discounter and modern retail investments is indirect through the shift from employment in small shops to larger retail outlets, and the associated working conditions. Mainly women benefit from this shift from self-employment to wage employment as mainly women are employed as employees in the retail sector.
 | The analysis and conclusions in this report draw upon a combination of different sourcesof information and insights: 1. existing studies
2. statistical material from a variety of sources that could be collected through desk study work
3. statistical data and qualitative information collected in previous studies where relevant to current report
4. newly collected data based on new interviews and surveys (taking place in June-July 2010 in a randomly selected a rural region. The selected regions were respectively Ialomita in Romania, Sandomiersko-jedrzejowsko in Poland and Pazardhik and Burgas in Bulgaria2. In each region stakeholders in small towns or — if possible — in villages were interviewed.)
 | N/A | * Provides a great overview of existing studies on employment creation effects of retail sector not only for Easter Europe but also for a few other emerging economies.
* Authors highlight that due to the limited number of cases on retail sector in Eastern Europe some of the findings have had to be based on case studies from other emerging economies based on their similarity to the region.
* Authors add that it was not possible to collect statistically representative/complete information for their current surveys due to budgetary constraints and refusal of some stakeholders to cooperate.
 | The analysis and conclusions in this report draw upon a combination of different sourcesof information and insights: 1. existing studies
2. statistical material from a variety of sources that could be collected through desk study work
3. statistical data and qualitative information collected in previous studies where relevant to current report
4. newly collected data based on new interviews and surveys (taking place in June-July 2010 in a randomly selected a rural region. The selected regions were respectively Ialomita in Romania, Sandomiersko-jedrzejowsko in Poland and Pazardhik and Burgas in Bulgaria2. In each region stakeholders in small towns or — if possible — in villages were interviewed.)
 | **Retail**  | Poland, Bulgaria, Romania  |

**Bibliography:**

Aayagari, Meghana, Demirguc-Kunt, Asli and Vojislav Maksimovic, 2011“Small vs. Young Firms Across the Word: Contribution to Employment, Job Creation, and Growth” , Policy Research Working Paper 5631, World Bank, Washington DC

Acs, Zoltan J. & Catherine Armington & Alicia Robb, 1999. "Measures of Job Flow Dynamics in the U.S. Economy," CRIEFF Discussion Papers 9907, Centre for Research into Industry, Enterprise, Finance and the Firm. Available at: <http://ftp.sbaonline.sba.gov/advo/research/rs192tot.pdf>

Aroca, Patricio, 2001. “Impacts and development in local economies based on mining: the case of the Chilean II region,” *Resources Policy*, Volume 27, Issue 2, June 2001, Pages 119-134, ISSN 0301-4207, 10.1016/S0301-4207(01)00013-7. (<http://www.sciencedirect.com/science/article/pii/S0301420701000137>)

Asiedu, Elizabeth, 2004. “The Determinants of Employment of Affiliates of US Multinational Enterprises in Africa. “ *Development Policy Review*, Vol. 22, No. 4, pp. 371-379, July 2004. Available at SSRN: [http://ssrn.com/abstract=557324](http://ssrn.com/abstract%3D557324)

Aterido, Reyes; Mary Hallward-Driemeier and Carmen Pagés-Serra, 2007. "Investment Climate and Employment Growth: The Impact of Access to Finance, Corruption and Regulations Across Firms," RES Working Papers 4559, Inter-American Development Bank, Research Department

Autor, David H., Frank Levy and Richard J Murnane, 2003. “The Skill Content of Recent Technological Change: An Empirical Exploration.” *Quarterly Journal of Economics* 2003 118:4, 1279-1333

Bagues, Manuel and Mauro Sylos Labini, 2008. “Do On-line Labor Market Intermediaries Matter? The Impact of AlmaLaurea on the University-to-Work Transition.” NBER Working paper 13621. August 27, 2008. Available at: <http://www.almalaurea.it/info/bagues-labini.pdf>

Betcherman, Gordon, Karina Olivas and Amit Dar. 2004. “Impacts of Active Labor Market Programs: New Evidence from Evaluations with Particular Attention to Developing and Transition Countries.” Washington, DC. World Bank Social Protection Discussion Paper Series 0402. Available at: <http://info.worldbank.org/etools/docs/library/251019/day6DiscussionPaperSeries0402April6Se1.pdf>

Bigsten Arne and Mans Soderbom 2005. What Have we Learned from a Decade of Manufacturing Enterprise Surveys in Africa. World Bank Policy Working Paper #3798. Washington DC

Bruhn, Miriam and Inessa Love, 2009. “The Economic Impact of Banking the Unbanked: Evidence from Mexico.” June 2009. World Bank Policy Research Working Paper Number 4981. The World Bank. Development Research Group. Finance and Private Sector Team. Available at: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1428628>

Bruhn, Miriam, Dean Karlan, and Antoinette Schoar. 2010. "What Capital Is Missing in Developing Countries?" *American Economic Review*, 100(2): 629–33. Available at: [http://karlan.yale.edu/p/BruhnKarlanSchoar\_AER\_P&P.pdf](http://karlan.yale.edu/p/BruhnKarlanSchoar_AER_P%26P.pdf)

California Economic Strategy Panel, 2011. “Using Multipliers to Measure Economic Impact.” Available at: <http://www.labor.ca.gov/panel/pdf/Using_Multipliers_to_Measure_Economic_Impacts.pdf>

Domanski, B and Gwosdz K., 2010. “Multiplier effects in local and regional development.” *Quaestiones Geographicae* 29(2), Adam Mickiewicz University Press, Poznań 2010, pp. 27-37, 1 Fig. ISBN 978-83-232-2168-5. ISSN 0137-477X. DOI 10.2478/v10117-010-0012-7. Available at: <http://geoinfo.amu.edu.pl/qg/archives/2010/QG292_027-037_Domanski.pdf>

Economics & Statistics American Chemistry Council, 2011. “Shale Gas and New Petrochemicals Investment: Benefits for the Economy, Jobs, and US Manufacturing.” Washington DC. Available at: <http://www.americanchemistry.com/ACC-Shale-Report>

FAO Investment Centre/EBRD Cooperation Program, 2011. “Poland, Bulgaria, & Romania: Social Impact of Discount Food Retail in Remote Regions.” Report Series N.16. June 2011. Available at: http://www.ebrd.com/downloads/research/sector/PBR\_Social\_Impact\_web.pdf

Fares, Jean, Claudio E. Montenegro, and Peter F. Orzam. 2006 “How are Youth Fairing in the Labor Market?Evidence from Around the World.” Washington, DC.: World Bank Policy Research Working Paper Series 4071.

Global Employment Trends 2011. International Labor Office. Geneva. Available at: [http://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms\_150440.pdf](http://www.ilo.org/wcmsp5/groups/public/%40dgreports/%40dcomm/%40publ/documents/publication/wcms_150440.pdf)

Gutierrez, Catalina, Carlo Orecchia, Pierella Paci and Pieter Serneels, 2007. Does Employment Generation Really Matter for Poverty Reduction? World Bank Policy Working Paper 4432. Washington DC

Haltiwanger John, Ron S. Jarmim and Javier Miranda, 2010. “Who Creates Jobs? Small vs Large vs Young” (2010) National Bureau of Economic Research, Working Paper Number 16300. Cambridge

ILO Employment Trends Unit, 2010. “Trends Econometric Models: A Review of the Methodology.” International Labour Office. January 19th, 2010. Available at: <http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_elm/---trends/documents/publication/wcms_120382.pdf>

Kapstein, Ethan and Rene Kim, 2011. “Sourcing Locally for Impact.” Stanford Social Innovation Review. Available at:<http://commdev.org/userfiles/file/lpimpactarticle.pdf>

Kapstein, Ethan and Rene Kim, 2011. “The Socio-Economic Impact of Newmont Ghana Gold Limited.” July 2011. Ghana. Available at: [**http://www.newmont.com/sites/default/files/Socio\_Economic\_Impact\_of\_Newmont\_Ghana\_Gold\_July\_2011\_0.pdf**](http://www.newmont.com/sites/default/files/Socio_Economic_Impact_of_Newmont_Ghana_Gold_July_2011_0.pdf)

Kapstein, Ethan and Rene Kim, 2010. “The Social and Economic Impact of Standard Chartered in Ghana.” October 2010. Ghana. Available at: <http://www.standardchartered.com/media-centre/press-releases/2010/documents/20101004/Ghana-our_social_and_economic_impact.pdf>

Kapstein, Ethan and Rene Kim, 2010. “The Social and Economic Impact of Standard Chartered in Indonesia.” October 2010. Indonesia. Available at: <http://www.standardchartered.com/sustainability/news/20101014/en/EIS_Indonesia.PDF>

Klapper, Leora, Raphael Amit, Mauro F. Guillen, Juan Manuel Quesada, 2007. “Entrepreneurship and Firm Formation Across Countries.” August 2007. World Bank Policy Research Working Paper Number 4313. The World Bank. Development Research Group. Finance and Private Sector Team. Available at: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1007152>

Marfan, Manuel and Patricio Meller, 1981. “Small and Large Industry: Employment Generation, Linkages, and Key Sectors,” Economic Development and Cultural Change, Vol. 29, No.2 (Jan., 1981), pp. 263-274

McKinsey Global Institute, 2011. “An Economy that works: Job Creation and America’s Future.” Available at: <http://www.mckinsey.com/mgi/publications/us_jobs/index.asp>

McKinsey Global Institute, 2010. “How to compete and grow: A sector guide to policy,” Available at: <http://www.mckinsey.com/mgi/publications/competitiveness/index.asp>

Muravyev, Alexander; Oleksandr Talavera, Dorothea Schafer, 2009. “Enterpreneurs’ gender and financial constraints: Evidence from international data.” Journal of Comparative Economics 37 (2009) 270-286. Available at: <http://www.sciencedirect.com/science/article/pii/S0147596708000899>

NCDO and Sustainalytics, Methodology: [www.mdgscan.com](http://www.mdgscan.com), NCDO & Sustainalytics, Version 4, April 2010

 O’Higgins, Niall, 2001. *Youth Unemployment and Employment Policy*. Munich Personal RePEc Archive. International Labor Office.

 Oosterhaven, Jan and Stelder, Dirk, 2002. “Net Multipliers Avoid Exaggerating Impacts: With A Bi-Regional Illustration for the Dutch Transportation Sector.” Journal of Regional Science, Vol. 42, pp. 533-543, 2002. Available at SSRN: [http://ssrn.com/abstract=330415](http://ssrn.com/abstract%3D330415)

 Peacock, Alan and David Simpson, 2004. “Fantasy Jobs: Finding a Better Measure of Indirect Employment” Policy Institute series. Economy No. 7. September 2004.

Available at. <http://policyinstitute.info/resource/2007/10/peacocksimpsonsep04.pdf>

 Sustainable Energy Department, 2011. “Issues in estimating the employment generated by energy sector activities.” The World Bank. Available at: [**http://siteresources.worldbank.org/EXTENERGY2/Resources/MeasuringEmploymentImpactofEnergySector.pdf**](http://siteresources.worldbank.org/EXTENERGY2/Resources/MeasuringEmploymentImpactofEnergySector.pdf)

Public

1. Establishment refers to a physical location [↑](#footnote-ref-1)
2. Ordinary Least Squares [↑](#footnote-ref-2)
3. Standard Errors [↑](#footnote-ref-3)
4. While authors make a disclaimer that the data is at the establishment level the words “firm” and “establishment” are used in the article interchangeably. “In the Enterprise Surveys, the establishment is defined as a physical location where business is carried out and where industrial operations take place or services are provided. In addition, an establishment must make its own financial decisions, have its own financial statements separate from those of the firm, and have its own management and control over its payroll.” [↑](#footnote-ref-4)
5. Coefficients are obtained by scaling down to one the simple average of industries backward (forward) employment linkage effects and computing the relative value of each industry [↑](#footnote-ref-5)
6. Small means 49 employees or less, large more than 49 employees. [↑](#footnote-ref-6)
7. Type I multiplier gives a total number of both direct and indirect jobs created for every direct job created, Type II multiplier gives a total number of direct, indirect and induced jobs created for every direct job. [↑](#footnote-ref-7)
8. Employment multipliers: First number is an open system estimate (Type I=direct+indirect), second number is a closed system estimate (Type II=direct+indirect+induced). [↑](#footnote-ref-8)
9. The fixed effects specification was rejected after Hausman test [↑](#footnote-ref-9)
10. Business services includes professional, scientific, and technical services; administrative and support services; and waste management services. [↑](#footnote-ref-10)
11. Other includes mining, utilities, wholesale trade and warehousing, information, self-employed and agriculture. [↑](#footnote-ref-11)
12. * To test this authors form an index of industry-level routine task intensity during the precomputer era. [↑](#footnote-ref-12)
13. The model is labeled to be “fixed coefficients” because elasticity of substitution between college and non-college workers is assumed to be zero. [↑](#footnote-ref-13)
14. In light of insufficient data for deriving projections for this indicator three models to derive it are presented on page 22 of the report. They are: (i) vulnerable employment rate is based on long term trend; (ii) rate is based on elasticity of vulnerable employment rate to the GDP growth rate observed in the year with the largest year drop in GDP on record; (iii) rate is based on application of the largest year-on-year increase in the vulnerable employment rate on record to each country’s unemployment rate. [↑](#footnote-ref-14)
15. The studies in the references though do not cover all the countries that sustainalytics report does, so median values of studies from India, Ghana,Cambodia, Phillipines, Egypt, US, Scottland, etc are used for all the countries in the report. The multipliers themselves seem to be only sector but not country dependent. [↑](#footnote-ref-15)
16. Home status is assigned to those who are neither employed, nor in school, nor seeking work. [↑](#footnote-ref-16)
17. Some of the estimates are cited based on the input-output tables from Bank of Scotland and on the previous studies but they are quite outdated. [↑](#footnote-ref-17)
18. There numbers might be high due to the fact that many of the jobs contracted by those in the direct chaing are in the informal sector which is estimated to need 5 times more labor than the formal one. [↑](#footnote-ref-18)
19. Results hold after controlling for many important characteristics of firms that are related to their creditworthiness and performance, and are robust to a number of specification checks addressing the issues of self-selection and omitted variables. [↑](#footnote-ref-19)
20. Eding, Gerard J, Jan Oosteraven, Bas de Vet, and Henk Nijmeijer. 1999 “Constructing Regional Supply and Use Tables: Dutch Experiences,” in G.D.J. Hewings, M. Sonis, M. Madden and Y.Kimura (eds,), *Understanding and Interpreting Economic Structure*, Berlin: Springer Verlag, pp.237-263.

RUG/CBS, 1999. *Regionale Samenhang in Nederland. Bi-regionale input-output tabellen en aanbod- em gebruiktabellen voor de 12 provincies en de twee mainport regio’s*. Groningen: Rijksuniversiteit Groningen/Centraal Bureau voor de Statistiek, REG-publicatie 20, Stichting Ruimtelijke Economie. [↑](#footnote-ref-20)