A ladder up

The role of the construction sector in creating jobs and rebuilding emerging market economies

2021

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Acknowledgments

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Abbreviations

ILO	International Labour Organization
FCEH	Final Consumption Expenditure of Households
ISIC	International Standard Industrial Classification of All Economic Activities
NAICS	North American Industry Classification System
OECD	Organisation for Economic Co-operation and Development
OSH	Occupation Safety and Health
SDG	Sustainable Development Goal
SME	Small and medium-sized enterprise
SSC	Sector Skills Council
UNCHS	U.N. Centre for Human Settlements

Executive summary

- This report provides evidence of the size of the construction sector and the socioeconomic characteristics of construction workers in emerging market economies. It also provides estimates of the output and employment multipliers associated with the construction sector. The report focuses on nine countries: Brazil, Colombia, India, Indonesia, Mexico, Peru, the Philippines, South Africa and Uganda; and focuses as much as possible on the building construction subsector, particularly for residential buildings.

- Findings indicate that the construction sector employs between 4% and 11% of the workforce in the countries examined, (between 6% and 8% in most countries). As the dominant part of the construction sector, building construction itself also represents between 4% and 11% of the workforce and is generally one of the largest employment sectors after agriculture.

- Construction workers are largely employed informally. Estimates range from 50% in South Africa, to 62% to 68% in Colombia and Peru, and 91% to 92% in India, Indonesia and Uganda. Between 89% and 98% of construction workers are men. However, given the size of the industry, this means that, in a large country like India, an estimated 2.3 million women are employed in some capacity in the building construction industry.

- Construction workers typically have limited levels of educational attainment. Between 41% and 84% have only completed primary education or less, and this figure is more than 70% in six of the nine countries analyzed. Construction workers are not typically younger than the rest of the population, indicating that it remains a source of employment over the life cycle.

- The estimated impact of an increase of one unit in construction output on overall output, ranges from 1.8 to 2.5, and the employment multipliers range from 1.4 to 2.3. An additional US$1 million in construction outputs annually is estimated to result in an overall increase in employment of 43 to 182 jobs annually through both direct and indirect effects.

- Data availability and accuracy limit the findings in this report. Further work is needed to better understand the links between residential building construction, employment and the economy. However, the available data establishes the role of the construction sector in providing formal and informal jobs for workers with limited education. In the three countries with income data, evidence shows that construction jobs pay well compared to other jobs for workers with limited educational attainment.

- Evidence pertaining to the size of the residential building construction sector and the incomes earned by its workforce underscores the importance of the construction sector to the economy, as well as its importance as an engine of economic growth. This evidence is critical given the relative invisibility of informal construction workers in many countries. In addition, these employment opportunities are largely local, as construction relies on local labor inputs and there are limited risks of outsourcing.

- Policies that stimulate construction of new housing units and the improvement of existing housing, as well as investments in residential infrastructure, can generate crucial local employment opportunities, particularly for that part of the workforce with low levels of formal education. At the same time, if implemented with a focus on equitable development and climate change, these policies and investments can produce long-term positive impacts on household welfare and energy efficiency. These policies can also enhance resilience in the face of disasters such as epidemics, hurricanes, earthquakes and floods.

Introduction

The construction sector, including residential construction, is labor intensive. In high-income economies, robust estimates have established the high output and employment multipliers of investment in residential construction. Figures show that construction jobs represent an important source of employment in emerging market countries, particularly for workers with limited education or who have recently migrated from the countryside to urban areas (Wells and Wall 2003; K'akumu 2007; Wells 2007; TCIS 2020). Indeed, construction is one of the top employment sectors in many countries. In India, construction including infrastructure and public works, represents the second largest employment sector after agriculture (KPMG 2020). Moreover, the construction sector is tied to other industries with large multiplier effects, including mining, timber, and oil and gas (Pietroforte and Gregori 2003).

Increasingly, construction activity has an important impact on local labor because most jobs are local and imports are primarily limited to raw materials with limited risk of outsourcing. However, construction activity is cyclical (Ruddock and Lopes 2006), with job losses occurring during recessions that result in exits from the construction industry (Lill 2009; Hyatt and McEntarfer 2012) with negative consequences for the supply of skilled workers during the recovery. Fiscal stimulus focused on construction projects has a countercyclical effect, with the potential to support stable employment in a key sector.

Given that the core inputs for residential construction are material and labor, with labor representing 20% to 40% of total costs, labor cost and quality have a major effect on housing affordability and quality. At the same time, the construction sector is very competitive and diverse, typically comprising a few large multinational firms, and many smaller contractors and subcontractors with varying labor conditions. Because the construction industry is generally competitive, contracts are often awarded based on lower bids, pushing companies to drive down costs rather than focus on improving the quality of their workforce. Construction workers are often employed informally with limited benefits and high exposure to safety and health risks (Well 2007; ILO 2015a). Furthermore, construction jobs are not systematically included in national training programs to develop strategic industries and go underrecognized as a source of relatively well-paying jobs for workers with limited education.

During the COVID-19 pandemic, the construction industry was, and continues to be, disrupted in emerging market economies. Construction workers, many of them rural migrants, have and continue to face precarious living conditions. As part of a research and advocacy initiative, Habitat for Humanity's Terwilliger Center for Innovation in Shelter developed an action plan to support the welfare and training of informal workers in the context of COVID-19 in India, with a particular focus on construction workers. The research findings showed that the construction sector in India, which employs over 50 million workers, is a major source of opportunity for migrants from rural areas. At the same time, the initiative highlighted the precarious working and living conditions that these workers faced during the pandemic, with massive job losses and limited unemployment benefits.

The construction sector has the potential to be an essential driver of jobs to support economic recovery. Increased efficiency in construction and a focus on sustainable technology in the sector are key to reaching several of the targets under the Sustainable Development Goals (SDGs) related to improved housing conditions (goal 11) and energy efficiency (goal 7). For example, recent evidence emphasizes the health benefits of programs that improve floors for the more than one billion households estimated to be living with dirt floors. Futher, there are environmentally sustainable ways of making these improvements (Mawad 2021).

This report provides data on the size of the construction sector as part of the economy and on the socioeconomic characteristics of construction workers in emerging market economies. It also provides estimates of the output and employment multipliers associated with the construction sector. The report includes data on nine countries: Brazil, Colombia, India, Indonesia, Mexico, Peru, the Philippines, South Africa, and Uganda, and focuses as much as possible on the building construction subsector, particularly residential buildings.

Findings indicate that the construction sector employs between 4% and 11% of the workforce in the countries examined, with model values between 6% and 8%. Moreover, as the dominant part of the construction sector, building construction itself represents between 4% and 11% of the workforce.

Between 89% and 98% of construction workers are men. However, given the size of the industry, this means that in a large country like India, an estimated 2.3 million women are employed in some capacity in the building construction industry. Construction workers typically have limited levels of educational attainment. Between 41% and 84% have only completed primary education or less; and this figure is more than 70% in six of the nine countries analyzed. In terms of age structure, construction workers are not typically younger than the rest of the population, indicating that it is an important source of employment over workers' life cycle.

The estimated impact of an increase of one unit in construction output on overall output ranges from 1.8 to 2.5, and the employment multipliers range from 1.4 to 2.3. An additional US$1 million in construction outputs is estimated to result in an overall increase in employment of 43 to 182 jobs through both direct and indirect effects.

Data availability and accuracy limit the findings in this report. Further work is needed to better understand the links between residential building construction employment and the economy. However, the available data do establish the role of the construction sector in providing formal and informal jobs for workers with limited education. In the three countries for which there is income data, the evidence shows that construction jobs pay well compared to other jobs for workers with limited educational attainment.

Evidence pertaining to the size of the residential building construction sector and the incomes earned by its workforce shows the importance of the construction sector to the economy, as well as its importance as an engine of economic growth. This evidence is particularly important given the relative invisibility of informal construction workers in many countries despite their large estimated share of their sector's workforce—for example, at 75% in India (Murthy 2019) and 79% in Peru (ILO 2019).

Policies that stimulate construction of new housing units, the improvement of existing housing, and investment in residential infrastructure; can generate crucial local employment opportunities. Particularly for that part of the workforce with low levels of formal education. Moreover, if implemented with a focus on equitable development and climate change, these policies and investments can produce long-term positive impacts on household welfare and energy efficiency. These policies can also enhance resilience in the face of disasters such as epidemics, hurricanes, earthquakes and floods. At the same time, measures to improve the working conditions and on-the-job training of construction workers can ensure the construction sector contributes to building back better out of the pandemic, focusing on sustainable and equitable urban development.

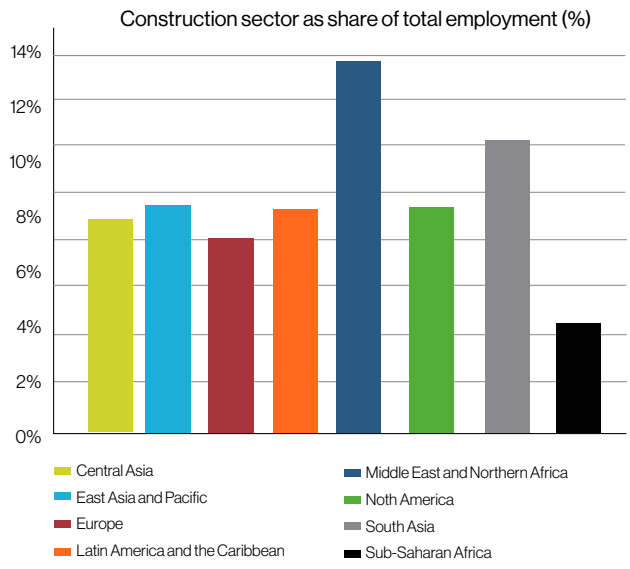
The next section provides a background of construction as a major economic sector. This includes an overview of the evidence on the characteristics of construction workers, and the multiplier effects associated with the construction industry. It also reviews existing studies that show the importance of skilled construction laborers, and labor conditions that can contribute to labor shortages in the sector. The section after that provides the analysis of the sociodemographic characteristics of construction workers in the selected emerging market economies. The section after that presents estimates of the output and employment multipliers for the construction industry. The final section discusses implications for designing investment programs that include capacity development for the building construction sector to support economic growth and sustainable development.

Background

Construction as a major employment sector

The construction sector is often one of the largest economic sectors in a country. A recent study found investments in housing contributed an average of 4% of GDP in 11 emerging market economies (TCIS 2020). Globally, construction is estimated to employ over 250 million workers and account for 7.7% of all employment (ILO 2020). There are variations by region, but estimates are consistently around 6% to 8% of the workforce employed in construction with the exceptions of: Sub-Saharan Africa, which is lower (3%); and South Asia and the Middle East, which is substantially higher (11% and 14% respectively) (Figure 1). The consistency of these figures reflects the fundamental role of the construction sector in all economies, while the lower share in Sub-Saharan Africa suggests undercounting due to much of the sector being informal, including a substantial proportion of residential self-build activity. Finally, in many emerging market economies, construction is often one of the fastest-growing labor market areas (ILO 2015a).

Figure 1: Share of employment in construction sector by region



Source: ILO, Most Recent Employment by Economic Activity Data for all Available Countries; and World Bank Regional Classification

The construction industry, particularly the residential sector, is mainly composed of small and medium-sized enterprises (SMEs). There are also a number of large enterprises, including multinationals, working on larger-scale infrastructure projects across many markets. Contractors and subcontractors recruit workers for specific tasks within residential construction, using temporary and casual employment contracts without social protection provisions (ILO 2021). This structure makes construction workers, particularly those in the informal economy, vulnerable to economic downturns like the one caused by the COVID-19 pandemic, which stopped construction projects for much of 2020 and led to decreased projected investments into 2021 (KPMG 2021).

Evidence relating to the sociodemographic characteristics of construction workers indicates that they tend to have lower educational attainment than the overall workforce, most having completed primary education or less. They are also more likely to be migrants from rural areas, with the construction industry serving as an important first step on the employment ladder for those with limited work experience (ILO 2015a). At the same time, wage levels are high relative to other industries with similar educational requirements. For example, the ILO estimates that the wage ratio (average monthly sector earning/average total earning) for the construction sector is 1.03, which is slightly above average. By comparison, for agriculture this wage ratio is 0.72, for accommodation and food services it is 0.71, and for manufacturing it is 0.95 (ILO 2020).

Construction is the most gender unbalanced of the 14 economic sectors tracked globally by the ILO, with women representing only 7% of all construction workers (ILO 2020). In the 1990s, the U.N. Centre for Human Settlements (UNCHS) commissioned studies in Mexico, Jamaica, India and Ghana to examine the role of women in the construction sector. The findings indicated that women were actively involved in construction but predominantly in lower-skilled positions—mainly carrying materials (Abankwa and van Geldermalsen 1997). Later research in different countries has confirmed that women are more likely to remain unskilled workers throughout their life. However, research also shows that there are opportunities to support organizations and training programs that improve outcomes for women in the construction industry (Abankwa and van Geldermalsen 1997; Lakhani 2004; Barnabas et al. 2009; Baruah 2010; Choudhury 2013; Hartrich 2018).

Employment multipliers

In addition to representing a substantial share of the overall economy, the construction sector has relatively large output and employment multiplier effects. Multiplier effects estimate the impact of a change in one sector on income and employment levels in the overall economy. These measures also recognize the backward (supplier) and forward (consumer) linkages across industries. They take into account the value of the output and the number of workers in the industry (direct effect), as well as the value of the output and number of workers in other industries that result from that activity (indirect output or Type I multipliers). In some cases, induced multiplier outputs are considered to capture the effect of the increased demand associated with the extra labor income generated by the additional activity (Type II multipliers). This report focuses on Type I multipliers.

The size of output and employment multiplier effects are well-documented in high-income economies, including specifically for residential construction. In the U.S., evidence shows that residential construction has a total output multiplier of 3.1 and an employment multiplier of 22 jobs per US$1 million in output, compared with 20 jobs for the construction industry as a whole (Fuller 2020). Similarly, in Australia a recent study by NHFIC (2020) estimated a total output multiplier for the residential sector of 2.9 and a smaller employment multiplier of 15 jobs per US$1 million in output (nine jobs per AUD1 million based on an exchange rate of AUD=US$0.63 as of March 2020). The total estimated output multiplier for non-residential building construction was 2.5. In that study, residential building construction had the second-largest economic multiplier of 114 industry sectors considered for Australia.

While existing evidence for emerging market economies is limited, some recent studies have provided recent data for the construction sector in a few countries (Uy 2006; IFC 2013; IHR 2020; KPMG 2020). In India, KPMG (2020) estimated an output multiplier of 2.2, and IHR (2020) reported an employment effect associated with US$1 million in construction output of eight jobs. In Tunisia, the IFC (2013) reports an estimated output multiplier of 5.3. Uy (2006) reported an output multiplier for the housing construction industry in the Philippines of 16.6, but it is unclear how this estimate was produced.

Overall, the evidence points to strong economic spillovers from the construction industry through backward and forward linkages with other industries and large employment effects both directly and indirectly. In addition, available estimates for the residential building construction sector are similar, and often somewhat higher than those for non-residential building or other construction sectors.

Skilled labor shortage

The construction sector has received limited attention within national job training and skill-building policies in emerging market countries. Other industrial sectors, like manufacturing, have often been the focus of national plans to develop training programs and support companies for that sector. However, skilled labor is crucial to the construction industry, affecting productivity, price and quality. Improving the construction workforce is an area that deserves further attention from the public, private and social sectors given the projected growth in demand for construction in rapidly urbanizing economies and evidence of current labor shortages in the construction industry in many countries (ILO 2020).

India provides an example of a country with a large and growing construction sector which, despite its importance, does not feature prominently among the country's skill development strategies. India's 2015 National Policy for Skill Development and Entrepreneurship identified priority activities to "equip its workforce with employable skills and knowledge so that they can contribute substantively to the economic growth of the country" (Ministry of Skill Development and Entrepreneurship 2015). Moreover, the document articulates the need to train 31 million workers in the building, construction and real estate sector between 2013 and 2022, the largest number of any sector and a

quarter of the estimated 121 million additional workers they expect to be needed during that period. However, the document does not mention any initiatives specific to the construction industry while highlighting priorities for the manufacturing, agriculture and I.T. sectors.

At the same time, there is a role for the construction industry in addressing many of the SDGs by tackling environmental sustainability of the built environment and existing housing needs. This has led to increasing recognition of the construction sector's potential to address those challenges. According to the ILO (2015b), it is a point of consensus that "the construction sector plays a vital role in economic development in developed and developing countries alike." The potential to build up skills in the construction industry by investing in education and training is essential to improving worker retention and productivity in the sector (ILO 2015b), and would increase the industry's impact on social and economic outcomes.

In addition to insufficient training, occupational safety and health (OSH) risks represent another area that has been highlighted as potentially contributing to labor shortages through increased turnover. Organizations like the ILO have produced reports on working conditions in the construction sector, which articulated efforts to improve worker conditions. In particular, the ILO highlighted the high level of hazard faced by workers, who are three to six times more likely to die from accidents at work in emerging market economies (ILO 2015a). Construction workers are also substantially more likely to experience adverse occupational health effects than workers in other sectors due to a combination of accidents, exposure to toxic substances, and occupational hazards such as heavy loads, weather conditions, tool vibration and noise (ILO 2015a). In Peru, for example, over half of workers reported having suffered, or knowing someone who suffered, an injury or accident at work, resulting in a disability in a quarter of the cases (ILO 2019). According to the ILO, "the causes of accidents and ill-health in the sector are well known, and almost all are preventable" (ILO 2015a). Efforts at the international and national level to mitigate occupational safety and health risks remain insufficient to effectively improve conditions for construction workers.

Recent promising initiatives to support the construction sector have focused on the creation of green and sustainable jobs in the building construction industry in a range of economies, (including Mozambique, Rwanda and Zambia), using market systems analysis to address constraints that "limit market growth, worker development, and business growth" (Hartrich 2018). For example, the Zambia Green Jobs Programme, implemented by the Zambian government with funding from the Finnish government and technical assistance from U.N. agencies from 2013 to 2018, used a value-chain development approach to support the creation of green jobs in the building construction sector. The program focused on the private sector and sustainable housing, and took a multidimensional intervention approach at different levels to enable the creation of green jobs with decent wages and working conditions (Megersa 2021).

This brief overview shows that the construction sector, including residential building construction, is a major source of employment with substantive multiplier effects on the rest of the economy. The sector is particularly important as a source of relatively well-paying jobs for individuals with limited educational attainment, representing a significant opportunity to build skills that are especially important for rural migrants entering growing urban regions. That said, women still have limited access to employment opportunities in the industry, particularly in more skilled positions, and workers continue to face substantial OSH risks. Therefore, there is an important role for nonprofit, public and private organizations to develop effective skill-building programs and operational standards for the construction industry. The following sections provide further evidence of the economic importance of the building construction sector for nine emerging market economies.

Sociodemographic characteristics of construction workers

Data collection and variables used. This study uses aggregate data on workers by industry made available by the ILO, to characterize the overall construction sector. The data are drawn from decennial censuses, or large-scale population or employment surveys; to further examine the sociodemographic characteristics of construction workers (Table 1). This study also relies on microdata made available through IPUMS International (Minnesota Population Center 2020). For Colombia, available data was used through the Colombia Census Bureau (DANE). The necessary microdata could not be obtained for Uganda.

A benefit of the IPUMS dataset is that the variables have been harmonized to be comparable across countries. IPUMS contains detailed individual and household level demographic and employment information (age, sex, marital status, educational attainment, industry and occupation code, and contract type). However, the datasets do not include important variables such as income because this information was only available for Brazil, Colombia, Mexico and South Africa.

Another limitation of the dataset is that some variables are highly aggregated. This study primarily relies on the International Standard Industrial Classification of All Economic Activities (ISIC), the industry classification system developed by the United Nations and available in the IPUMS database. This ISIC system only disaggregates construction of buildings (Division 41 and 43) from construction of infrastructure and civil engineering projects (Division 42). It would be helpful to have access to harmonized data that allows for specific identification of residential building construction (as is possible with the classification system used in Brazil, Colombia and Mexico). For example, the North American Industry Classification System (NAICS) has a four-digit code level (2361) that corresponds to residential building construction and captures firms involved in the construction or remodeling / renovation of single-family / multifamily residential buildings.

Table 1: Data sources and main elements

Country	Industry identified	Residential indentified	Socio-demographic	Income	Year	Source
Brazil	Building construction	Yes	Yes	Yes	2010	Census, Instituto Brasileiro de Geografia e Estatística
Colombia	Building construction	Yes	Yes	Yes	2019	Household Survey (GEIH), Departamento Administrativo Nacional de Estadística
India	Building construction	No	Yes	No	2009	Socio-Economic Survey, Household Schedule 10, National Sample Survey Organization, Government of India
Indonesia	All construction	No	Yes	No	2010	Census, Central Bureau of Statistics
Mexico	Building construction	Yes	Yes	Yes	2015	Census, Dirección General de Estadística, Secretaría de Industria y Comercio
Peru	Building construction	No	Yes	No	2007	Census, National Institute of Statistics and Computing
Philippines	Building construction	No	Yes	No	2010	Census, National Statistics Office
South Africa	Building construction	No	Yes	Yes	2007	Census, Statistics South Africa
Uganda	N/A	N/A	N/A	N/A	N/A	N/A

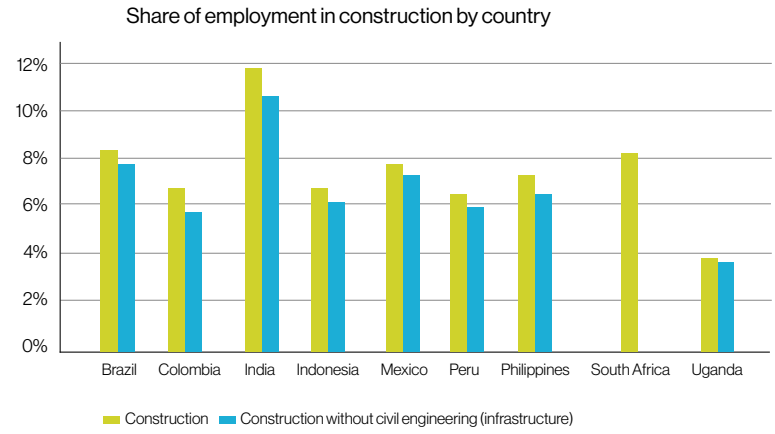
Data from household surveys was used to describe the sociodemographic characteristics of construction workers, and to compare these to data on the overall workforce and data on workers with lower levels of education. The main variables available for Brazil, Colombia, Mexico and South Africa are age, educational attainment, sex, employment status and income. The data include individuals working in formal and informal occupations, but informal workers survey coverage varies across countries. The data are weighted based on the individual weight provided to be representative of the overall population.

Findings on employment in construction

Share of employment

Construction is one of the largest industrial sectors in most countries. Among the 87 two-digit ISIC codes reported in the ILO dataset, it is one of the 10 largest sectors in all eight countries, and among the five largest in six of them. The overall construction sector (building construction plus civil engineering) employs between 6% and 8% of the overall workforce in seven of the nine selected countries. In the other two selected countries, the construction sector employs 4% of the overall workforce in Uganda and 12% in India (Figure 2). The numbers are only 0.2 to 1.2 percentage points lower when looking at building construction and specialized building services without civil engineering activities, which account for infrastructure including the construction of roads, railways, utility projects and other civil engineering projects. These findings imply that the estimates of output and employment multipliers for the overall construction sector presented in the next section (including civil engineering projects), should largely reflect multipliers for building construction. The rest of the descriptive analysis in this section focuses on workers in building construction, excluding civil engineering, since it is available for all selected countries except South Africa, where data for all construction workers are imported. In addition, in Brazil, Colombia and Mexico—where information about residential construction is available—residential construction represents over 80% of building construction. The findings on building construction are therefore likely to be quite similar for residential construction specifically. However, the residential construction sector will consist of workers earning lower incomes, who are more likely to be participating in the informal sector. Such workers are therefore more likely to be undercounted in standard employment surveys.

Figure 2: Share of employment in construction sector by country



Source: : ILO, 2015 (except 2017 for Uganda and 2018 for India). 2020 Q1 Quarterly Labor Force Survey for South Africa

Gender: When looking at the gender breakdown, the share of male workers ranges from 89% in South Africa to 98% in Indonesia (Table 2), comparable to the global figure of 93% of male workers reported by the ILO. Therefore, women are a small share of the construction workforce. Nevertheless, women are estimated to represent 2.3 million construction workers in India, 209,000 workers in Brazil, 166,000 workers in Indonesia, and 145,000 workers in South Africa. Their working conditions and access to skilled positions are important components for construction-focused employment initiatives.

Informality: Many construction workers are estimated to work in the informal sector, ranging from 50% in South Africa to 92% in Uganda, with Latin American countries in the 60% to 70% range, and India and Indonesia above 90%. This reflects the large share of workers employed without contracts, often as day laborers for individual projects versus being formally employed by a firm.

Table 2: Construction workers' share of workforce and gender breakdown

	No. of construction workers (in the 000s)	Construction workers share of workforce	Share construction workers, male	No. of construction workers, female (in the 000s)	Share construction workers, informal
Brazil	7,036	7.7%	97.0%	209	66.9%
Colombia	1,135	5.7%	95.3%	54	68.0%
India	38,239	10.6%	94.1%	2,261	90.9%
Indonesia	7,351	6.2%	97.7%	166	91.3%
Mexico	3,620	7.2%	97.0%	109	N/A
Peru	987	5.8%	96.6%	34	61.9%
Philippines	2,579	6.6%	97.6%	62	N/A
South Africa	1,357	8.2%	89.4%	145	50.0%
Uganda	324	3.6%	96.1%	12	92.4%

Source: ILO, 2015 for all countries except 2017 for Uganda and 2018 for India. 2020 Q1 Quarterly Labor Force Survey for South Africa. Construction is only building construction and specialized construction services (ISIC 41 and 43), not civil engineering projects (ISIC 42) except for South Africa, where it includes all construction.

Educational attainment, employment status, age and income: Table 3 reports microdata for available countries. The table compares workers in building construction to the overall workforce in terms of educational attainment, employment status and average age. It also includes median monthly income (in 2021, US$) in the countries for which data are available.

Table 3: Construction worker sociodemographic characteristics

Panel A: Construction sector

	Education				Employment status				
	Less than primary (%)	Primary (%)	Secondary (%)	University (%)	Self-employed (%)	Wage / salary (%)	Unpaid (%)	Average age (in years)	Median income (US $ 2021)
Brazil	44.2	36.3	16.2	3.3	38.7	60.9	0.5	37.9	534.8
Colombia	32.8	21.7	43.8	1.7	36.6	63.3	0.1	40.6	343.6
India	45.2	38.4	13.6	2.9	10.8	88.1	1.1	34.7	N/A
Indonesia	7.8	66.7	22.4	3.2	15.5	84.1	0.5	37.1	N/A
Mexico	20.0	63.4	10.7	5.8	24.8	74.0	0.6	37.8	395.6
Peru	16.4	25.0	50.0	8.7	28.7	70.4	0.9	37.5	N/A
Philippines	13.7	38.2	45.4	2.3	64.9	32.4	2.2	37.1	N/A
South Africa	19.4	56.0	19.9	3.6	17.2	80.3	0.5	36.9	210.9
Uganda	23.0	59.9	15.0	2.5	28.0	69.4	2.6	32.1	N/A

Panel B: Overall workforce

	Education				Employment status				
	Less than primary (%)	Primary (%)	Secondary (%)	University (%)	Self-employed (%)	Wage / salary (%)	Unpaid (%)	Average age (in years)	Median income (US $ 2021)
Brazil	27.9	28.9	31.0	12.3	24.4	74.1	1.5	31.6	511.4
Colombia	26.2	18.6	33.5	21.7	38.9	59.4	1.7	39.3	336.6
India	40.0	31.7	19.8	8.6	34.9	49.6	15.5	37.4	N/A
Indonesia	14.7	53.4	26.6	5.3	46.5	40.3	13.3	38.1	N/A
Mexico	11.8	47.6	24.0	16.5	26.2	71.1	2.7	38.2	329.7
Peru	20.2	19.1	47.4	13.3	44.3	49.3	6.4	37.3	N/A
Philippines	15.0	26.5	43.9	14.1	33.6	62.2	4.2	37.1	N/A
South Africa	15.0	53.2	25.6	5.1	13.1	84.5	2.3	35.1	445.7
Uganda	41.7	47.4	2.5	2.5	52.0	40.7	7.3	34.0	N/A

Source: IPUMS-I and DANE as described in Table 2. Results in Panel A are for building construction workers except for South Africa, which includes all construction workers. Income is the median monthly income in 2021 US$.

In six of the nine countries, more than 70% of the workers in construction have not completed secondary education. In Peru, the rate is 41%, while in the Philippines it is 52%. With the exception of Uganda, that share of the workforce is substantially lower than for the overall population, and is an indication that construction as an industry provides opportunities for workers with relatively low levels of education. When looking at employment status, construction workers are generally more likely to be salaried than the overall population, apart from in the Philippines and Brazil, where informal workers are classified as self-employed. However, the share of self-employed workers is substantial—above 20% except in India, Indonesia and South Africa—reflecting a large number of small contractors. Sometimes, the owner of a residential construction firm is the only worker. One of the dimensions on which workers are not systematically different from the rest of the population is the average age. Contrary to expectation, given the physically arduous working conditions, construction workers are not substantially younger than the overall workforce, with an average and median age between 37 and 38, and at least 25% of workers being older than 45 in seven of the nine countries.

Income data are only available for four countries: Brazil, Colombia, Mexico and South Africa. In Brazil and Mexico, the median income of construction workers is slightly above the overall median, and it is similar to the median income in Colombia. In South Africa, the earnings of construction workers are substantially lower than for the overall population. When looking specifically at earnings among workers with less than primary education, construction workers in this category earn about 40% more than the median in the overall workforce in Brazil and Mexico, 10% more in South Africa, and 7% more in Colombia. While not highly paid, construction workers are generally earning incomes that place them in the middle class and receive higher pay than workers with similar education levels in other industries.

Output and employment multipliers

Estimates of the output and employment multipliers associated with the construction industry rely mainly on two sources of data: the Organisation for Economic Co-operation and Development (OECD) Input/Output Tables, 2018 edition, based on 2015 National Standard Account data (does not include Uganda) and the ILO Employment by Economic Activity data for 2015 (does not include South Africa).

The OECD input/output tables reflect the linkages between industrial sectors and are harmonized for the countries included in this study. They capture the inter-industrial flows of goods and services for all OECD countries and 28 non-member economies, including key emerging market economies discussed in this study. The data are broken down for 36 industries, including construction. However, because they group the ISIC codes 41-43, it is impossible to differentiate building construction and residential building from civil engineering infrastructure and utility projects. Another limitation is that the latest available year for the data is 2015.

The ILO dataset on employment by activity is compiled from the labor force surveys or household surveys conducted annually in many countries. The data include ISIC two-digit breakdowns identifying building construction separately from other construction and are updated to 2019 for many countries based on annual labor surveys. The level of disaggregation of the data makes it possible to match the format of the industries reported in the OECD input/output tables.

This dataset was used and established methodology was followed (ONS 2017) to generate the following multiplier measures that capture the direct and indirect (but not induced) effects of changes in construction activity. Key terms are defined as follows:

Output multiplier is the total impact on overall output of a change in activity in a given industry (i.e., how a one unit increase in construction activity affects the overall output through direct and indirect effects as expressed in the Leontief Inverse). Given an input-out matrix A and the identity matrix I, the Leontief Inverse is defined as (I -A)-1. It captures all direct and indirect effects on output in one sector resulting from a one unit change in output in another sector. The OECD tables contain the Leontief Inverse that can be summed up to produce the output multiplier for a given sector.

Employment multiplier is the total impact on employment, of a change in activity in a given industry resulting in an additional unit of employment in that industry (e.g., how total employment changes with an increase of one unit in employment in construction). The ratio of jobs to output per industry is combined with the Leontief Inverse to estimate this multiplier as follows: $\text{Employment Multiplier}_j = ((w_i * L_{ij})/w_j)$ with wthe ratio of job to output in industry i, L the Leontief inverse for industry i and the construction industry j and wj the ratio of jobs to output in the construction industry.

Employment effect is the total change in employment associated with a US$1 million increase in construction output. A limitation of that metric is that it is useful to compare employment effects across industries, but less so across countries with different levels of productivity and wages. In addition, given a similar contribution of labor to output, industries with lower wages will mechanically have higher employment effects for a US$1 million increase in output even if they have low multiplier effects.

As described in the data and methods section, the OECD input/output tables by sector are used to estimate the effect of a one unit increase in output in the construction industry on overall output. The output data are combined with the data on employment by sector from the ILO to estimate employment multipliers and the employment effect associated with a US$1 million annual increase in output in the construction industry. The overall employment effect associated with a US$1 million expenditure is the number of jobs per US$1 million output in the construction industry (direct employment effect) along with the number of jobs per US$1 million output in the industries in which additional jobs are created (indirect employment effect).

These estimates are reasonable approximations for the marginal changes in output for industries facing elastic labor and capital input supplies. For larger changes, output and employment multipliers would be smaller due to supply constraints, particularly of skilled labor supply.

Table 4: Output and employment multipliers and employment effects for the construction sector, 2015

	Output multipliers	Employment multipliers	Employment effect (US$1 M)	Direct employment effect (US$1 M)	Indirect employment effect (US$1 M)
Brazil	2.1	1.7	66	39	27
Colombia	2.1	2.3	61	26	35
India	2.5	1.8	182	99	83
Indonesia	2.0	2.1	95	46	49
Mexico	1.8	1.6	43	27	16
Peru	2.1	1.6	69	42	27
Philippines	2.2	1.4	165	119	45
South Africa	2.6	N/A	N/A	N/A	N/A
Uganda	N/A	N/A	N/A	N/A	N/A

Source: OECD: Input/Output data by sector, including construction industry (ISIC 41-43). ILO: Employment by Sector, including for Construction Industry (ISIC 41-43).

Output multipliers: Across countries, the estimated output multipliers for the construction industry, obtained by summing up the Leontief Inverse, range between 1.8 (Mexico) and 2.6 (South Africa), with five countries falling between 2.0 and 2.2. For an additional US$1 million in construction output, the total output for the economy increases by an estimated US$2 million to US$2.2 million.

Employment multipliers: An additional job in the construction industry is associated with 1.4 (the Philippines) to 2.3 (Colombia) additional jobs in the economy. The employment effect of an additional US$1 million of annual output in the construction industry is estimated to range between 43 and 182 jobs, with direct employment effects estimated to be between 26 to 119 jobs and indirect employment effects between 16 and 83 jobs.

The Appendix provides output and employment multipliers for selected sectors of the economy including manufacturing (ISIC 10-33), agriculture (ISIC 01-03) and food and beverage services (ISIC 55-56). Construction has output and employment multipliers that are substantially larger than the agricultural sector in all countries and generally larger than those of the accommodation and food services sector. However, the output multipliers are lower than the manufacturing sector, while the employment multipliers are substantially lower.

Overall, the output and employment multipliers associated with the construction sector are substantial. A US$1 million increase in output in the construction industry is estimated to be associated with a considerable number of direct and indirect jobs. Compared to other sectors, the effects are larger than for the agriculture and accommodation and food services sector but smaller than for the manufacturing sector, particularly the employment multipliers.

Conclusion

In the nine countries studied, building construction workers represent a substantial share of the workforce: between 6% and 8% of overall construction in seven countries, 4% in Uganda and 11% in India. In terms of sociodemographic characteristics, construction workers are predominantly men with a lower level of education than the average workforce, and are more likely to be salaried. From the three countries with information on income, evidence suggests that construction workers earn slightly more than the median income, particularly when compared to workers with similar levels of education.

The economic and employment multipliers associated with the construction industry are substantial. For the countries with the required information to enable estimates, the report indicates that a one unit increase in construction output is associated with an increase of 1.8 to 2.5 in overall output. The employment impact of a US$1 million increase in output in construction is estimated to result in 26 to 119 direct jobs and 16 to 83 indirect jobs.

These findings are limited by data availability. In particular, data could not be broken down for the overall building construction industry and residential building construction industry. Uganda was also not able to be included as part of the multiplier estimates. In addition, it is likely that informal workers are underrepresented in the household surveys that are the basis of the datasets, due to both an undercounting of residents of informal settlements and underreporting of informal activity, resulting in underestimation of the overall size of the construction sector and its relationship with the overall economies studied.

The results are aligned with existing evidence in high-income economies, like the U.S. and Australia, that have found the construction industry to have large employment multiplier effects and have confirmed these findings for building construction specifically. However, the output and employment multipliers estimated in the selected countries are somewhat lower than those found in high-income economies. This requires further investigation to understand whether this is related to the quality of the data or the actual linkages across industries.

The linkages across industries may differ in construction sectors in emerging market economies due to more local supply chains, more integrated building processes or other factors. Supply chains in higher-income countries might be more integrated and complex. As the quality of housing construction improves the nature and quantity of inputs, inclusion of labor may also increase. There might also be a larger downstream effect for induced consumption associated with new buildings (e.g., appliances and furniture) in higher income countries. Nevertheless, the estimated direct and indirect employment effects associated with a US$1 million increase in construction output are substantial.

As emerging market economy countries continue to urbanize, there is a strong and growing need for a productive construction sector that can deliver decent housing, particularly for the low-income segment. Evidence on differences in labor productivity in the construction sector is limited, but further work to identify how skills and management can increase labor productivity while using similar technology, (e.g., for brick laying), is needed. A skilled construction workforce is also needed to deliver more affordable, environmentally sustainable and climate-resilient buildings. Skill-building in the construction sector can focus on training and certification schemes that align with construction laborers' preference for on-the-job training as opposed to the traditional classroom or vocational training that requires an extended period to complete.

The construction sector can be further incorporated as part of economic strategies, training programs and infrastructure plans. A particular focus has been on ensuring that the construction sector incorporates greener building technology. Recent promising initiatives have focused particularly on supporting the creation of sustainable and green jobs in the building construction industry in a range of economies using market systems analysis to address constraints that "limit market growth, worker development, and business growth" (Hartrich 2018). As discussed above, this includes the Zambia Green Jobs Programme that used a value-chain development approach to foster the environment for creating green jobs with decent wages and working conditions. Learning from these efforts and building on them at scale can improve working conditions for construction workers who often face substantial OSH risks and lack of stable employment.

Programs to recognize prior worker experience and build worker skills are also important to ensure progression over the course of their career since, as the data indicate, construction workers are not only young adults in temporary jobs. These workers start young and

gain experience and skills on the job, but most will receive no formal training over their careers (TCIS 2019; Merrill et al. 2021). Training opportunities can include short courses, programs run through large material suppliers, or other flexible approaches that recognize skills learned on the job and do not require long and costly commitment but rather, enable workers to transition out of lower-skilled and more precarious positions (Hartrich 2018; TCIS 2019).

The size of the construction sector, its growth potential and the current working conditions faced by many workers are gaining recognition, as is the importance of housing in reaching several of the SDGs. This creates an opportunity for national governments and development finance institutions to invest in analyzing the roadblocks to the growth of the sector and supporting the development of a business environment conducive to improving skills and working conditions. With appropriate interventions, the labor conditions and productivity of the construction sector could improve in ways that support both economic growth and attainment of development goals, including increasing the supply of affordable housing globally.

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Appendix

Output and employment multipliers for selected sectors, 2015

	Agriculture		Accomodation and food services		Manufacturing	
	Output multipliers	Employment multipliers	Output multipliers	Employment multipliers	Output multipliers	Employment multipliers
Brazil	2.0	1.3	2.0	1.4	2.6	8.2
Colombia	1.6	1.2	1.7	1.5	2.3	21.7
India	1.5	1.2	2.3	2.4	2.6	14.2
Indonesia	1.6	1.2	2.3	2.0	2.3	10.5
Mexico	1.7	1.2	1.6	1.2	2.4	5.5
Peru	1.5	1.1	1.8	1.5	2.2	14.0
Philippines	1.8	1.4	2.0	1.4	2.3	21.3
South Africa	2.4	N/A	2.3	N/A	2.7	N/A
Uganda	N/A	N/A	N/A	N/A	N/A	N/A

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