The Office of the Chief Economist of the South Asia Region

OCTOBER 2023

South Asia Development Update

Toward Faster, Cleaner Growth

WORLD BANK GROUP

Two Questions

1. What can spur investment in energy efficient technologies?

2. How will the energy transition shape labor markets?

Two Questions

1

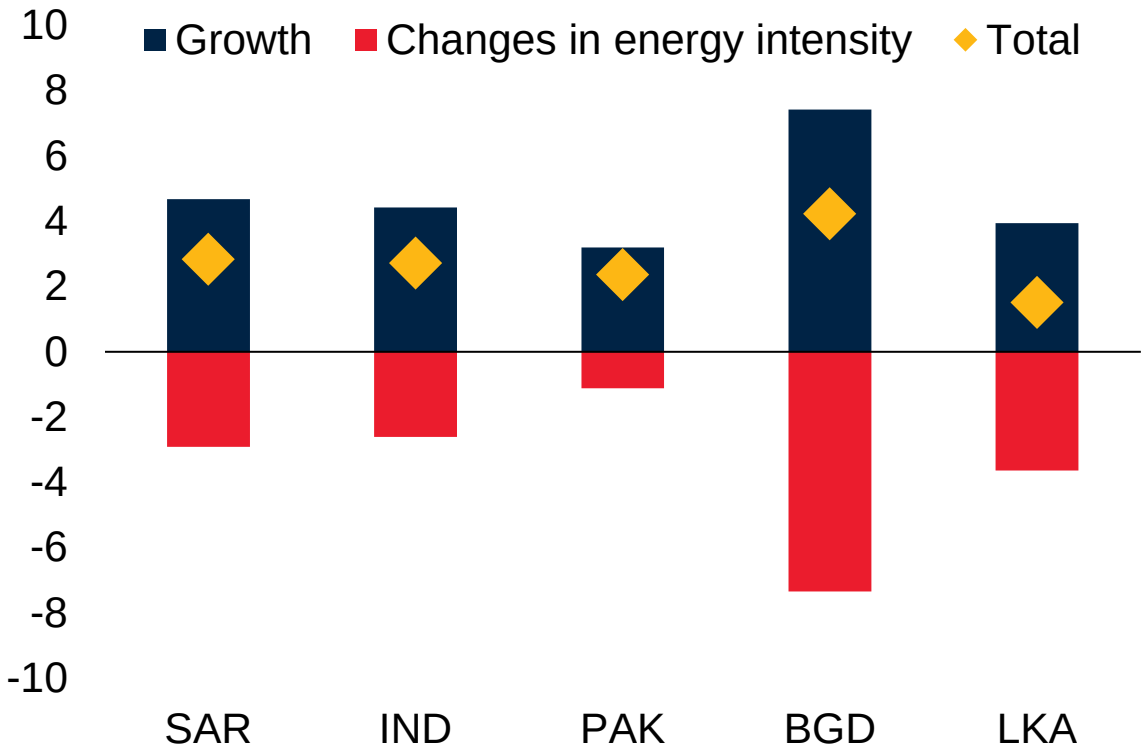
What can spur investment in energy efficient technologies? *SAR's energy intensity is twice the global average, firms lag in adopting advanced technologies. Regulation, financing, information can help*

Energy Intensity of Output in South Asia

Despite Improvements, Twice the Global Average

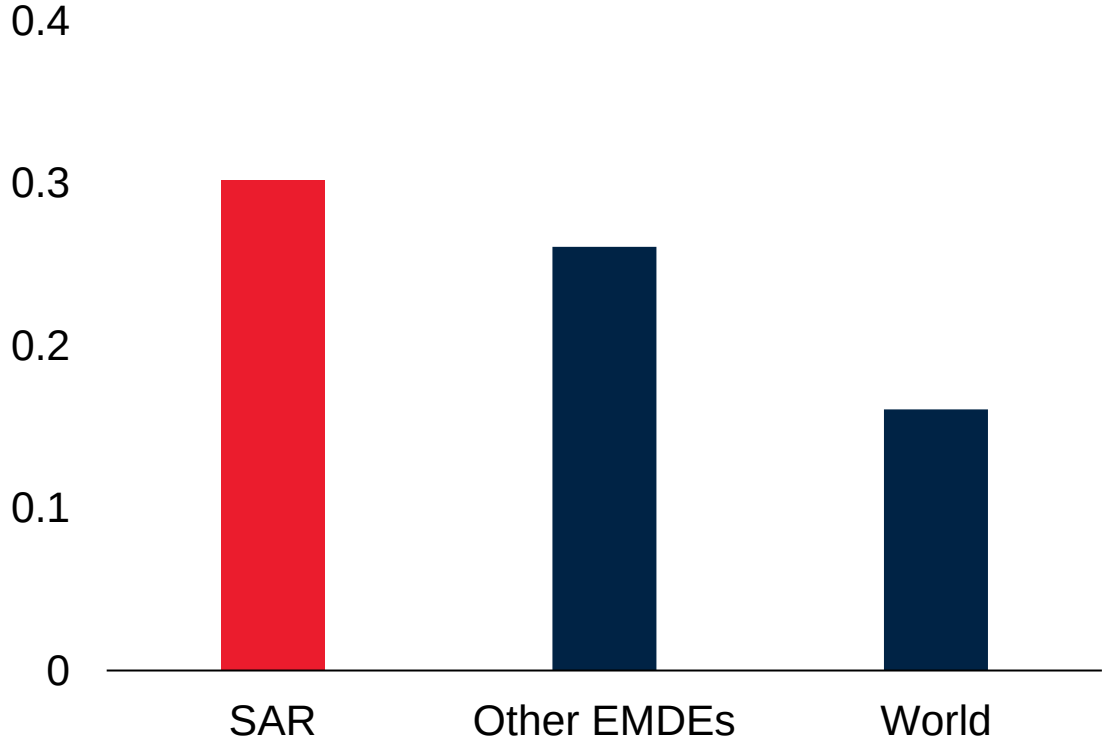
Contribution to energy consumption growth, 2010-2020

(Percentage points per year)



Energy intensity of output, 2020

(Toe/thousand US$)



Sources: WDI, European Commission; OECD Green Growth database (Left chart); World Bank Enterprise Surveys (Right chart)

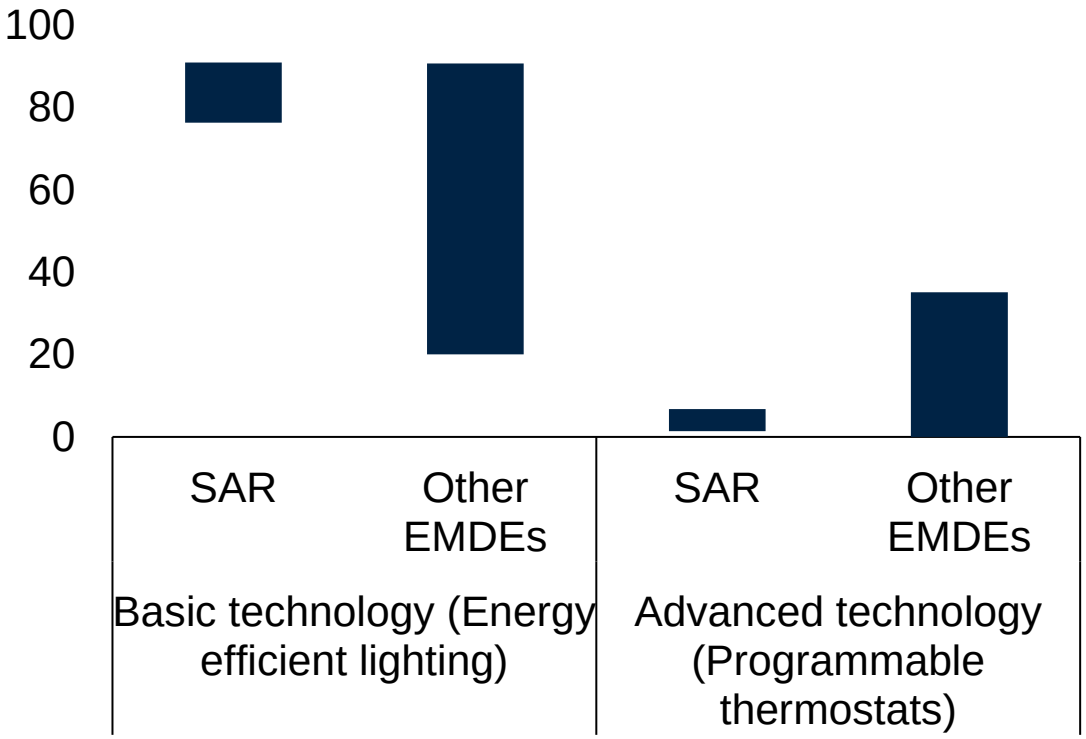
Note: Energy intensity is defined as energy consumption (in tons of oil equivalent, toe) relative to nominal GDP (in thousands of U.S. dollars). Left Panel: Data on energy consumption in SAR is only available for Bangladesh, India, Pakistan, and Sri Lanka. Latest available data is for 2020. SAR is a GDP-weighted average.

Energy Intensity of Output in South Asia

Firms Lead in Basic-Technology Adoption, Lag in Advanced-Technology Adoption

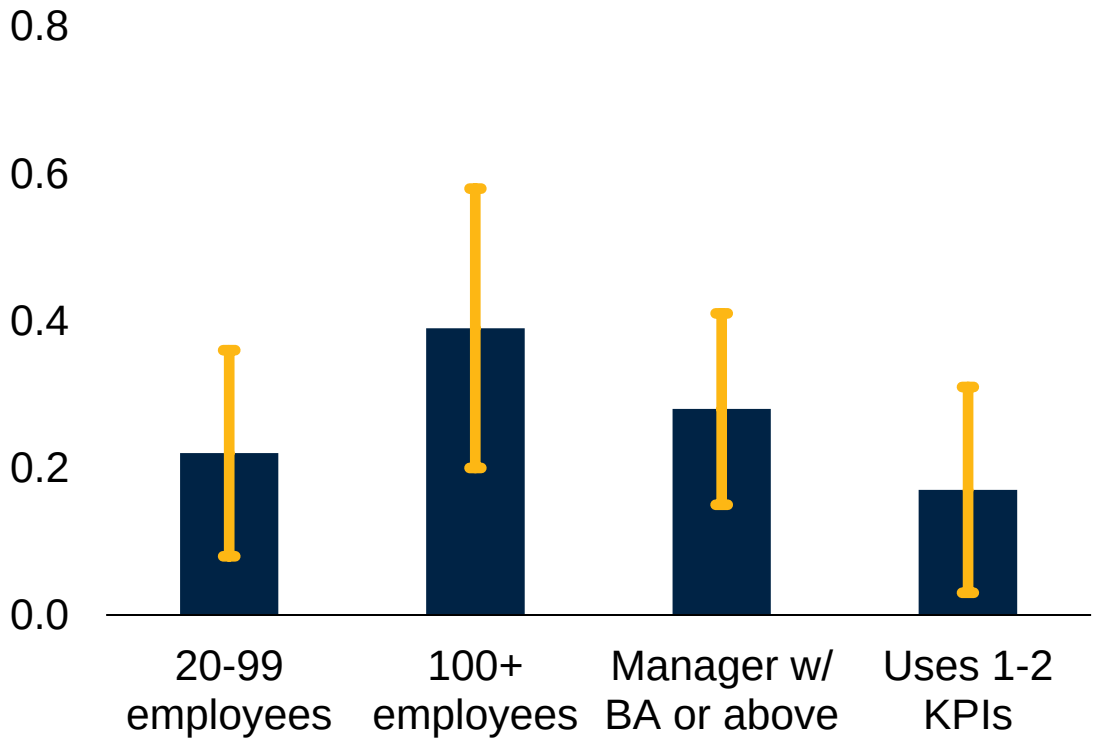
Adoption rates of energy efficient technologies in firms

(Percent)



Firm characteristics and technology adoption

(Technology index points)



Source: World Bank Firm Level Adoption of Technology Surveys

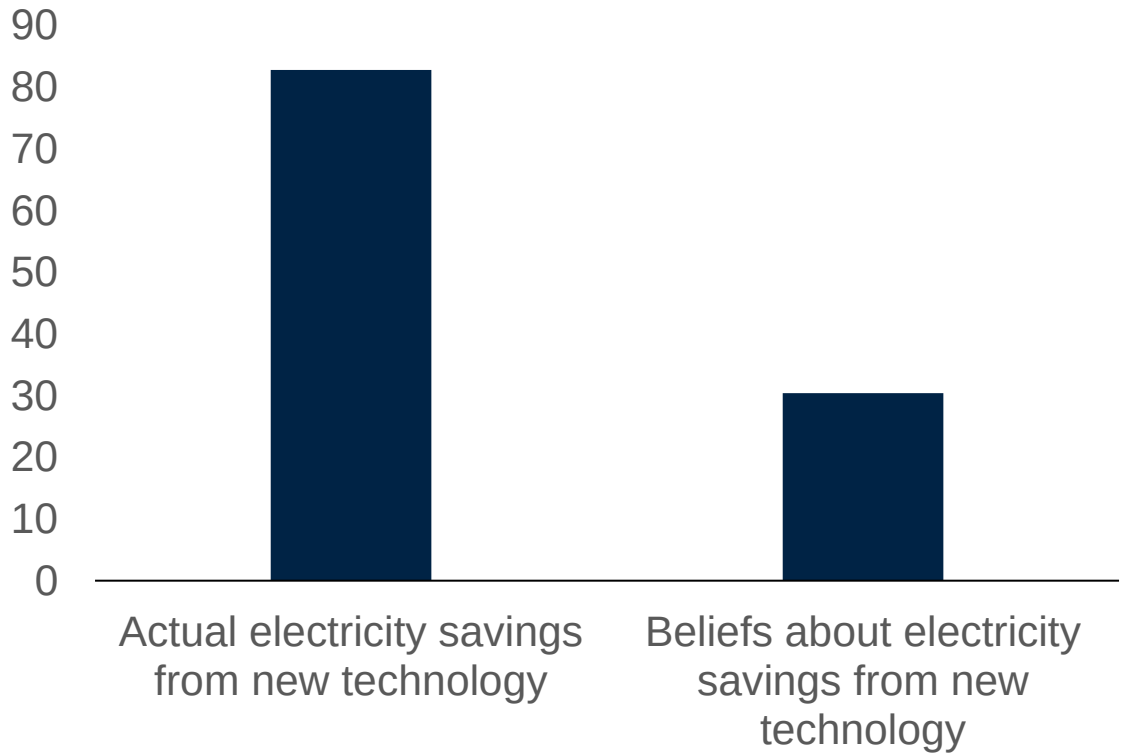
Left Panel: Includes World Bank's Firm Adoption of Technology (FAT) Surveys of 10,090 firms in seven EMDEs (Brazil, Bangladesh, Cambodia, Chile, Ethiopia, India, and Georgia). Depicts the range of country-level averages of percent of firms adopting technologies in SAR and other EMDEs. Right Panel: Charts depict coefficient estimates with 95 percent confidence intervals from OLS regressions of Energy Efficient Technology Index on firm attributes, including employment size, sector, and region dummies. KPI = Key Performance Indicator. The Technology Index ranges from 0 to 6 in value. The sample for the regression is the FAT Survey Wave 2 pooled data for 2,436 firms in Bangladesh, India and five other EMDEs.

Policy Options to Encourage Firm Technology Adoption

Firms Underestimate Benefits of New Technologies

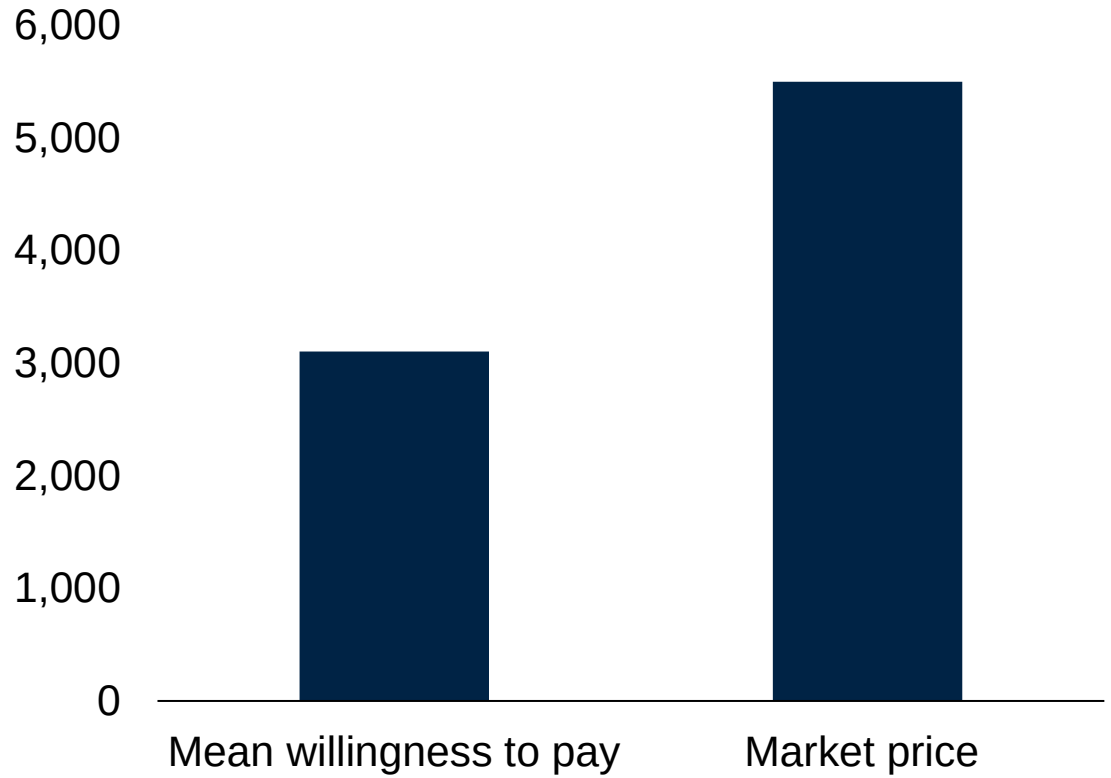
Actual versus perceived savings from a new energy-efficient technology

(Percent)



Willingness to pay for new technology

(Bangladeshi Taka)



Sources: Chaurey et al. 2023; World Bank.

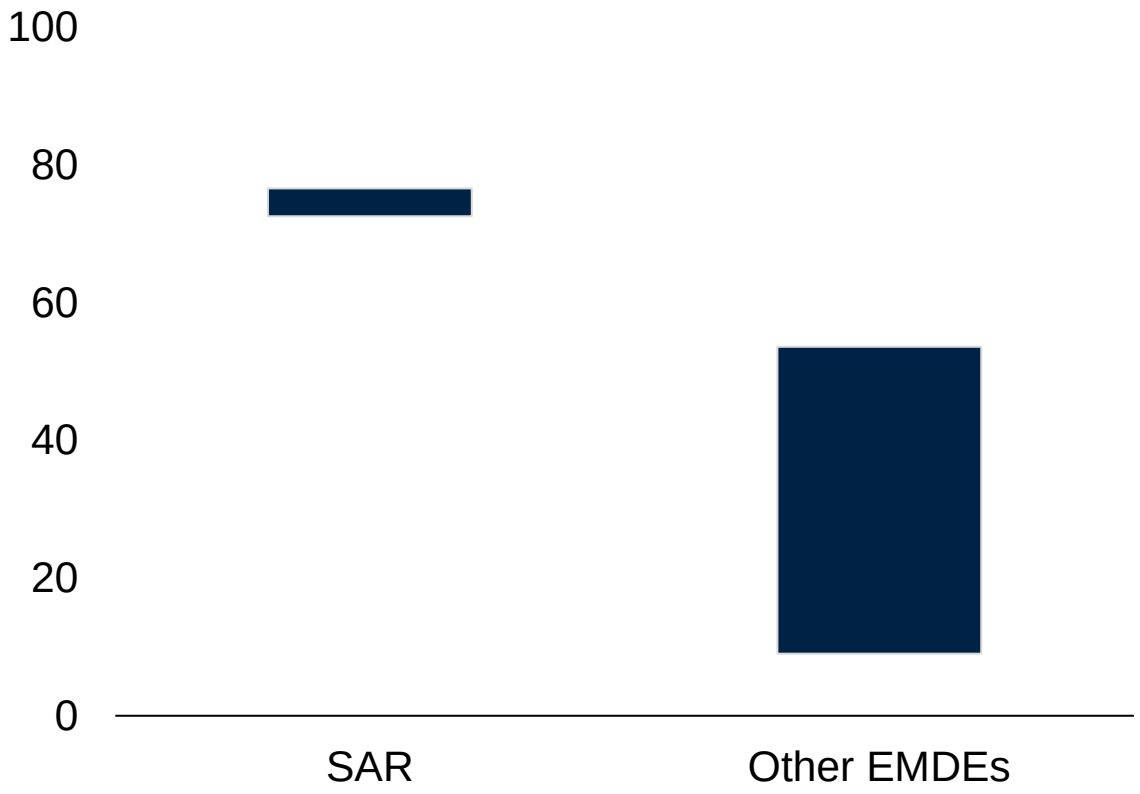
Note: From a study of technology adoption among 504 firms in the leather goods sector of Bangladesh (Chaurey at al, 2023) . Left Panel: The left bar depicts the estimated percentage reduction in electricity consumption per day from switching a clutch motor (old technology) with a servo motor (new technology) in a sewing machine, based on readings from electricity meters installed in 124 firms. The right bar depicts the percentage reduction in electricity consumption implied by firms' mean beliefs about electricity consumption in clutch versus servo motor sewing machines, estimated from survey data. Right Panel: Willingness to pay for new technology and market price of new technology.

Policy Options to Encourage Firm Technology Adoption

Provision of Reliable Power Grid

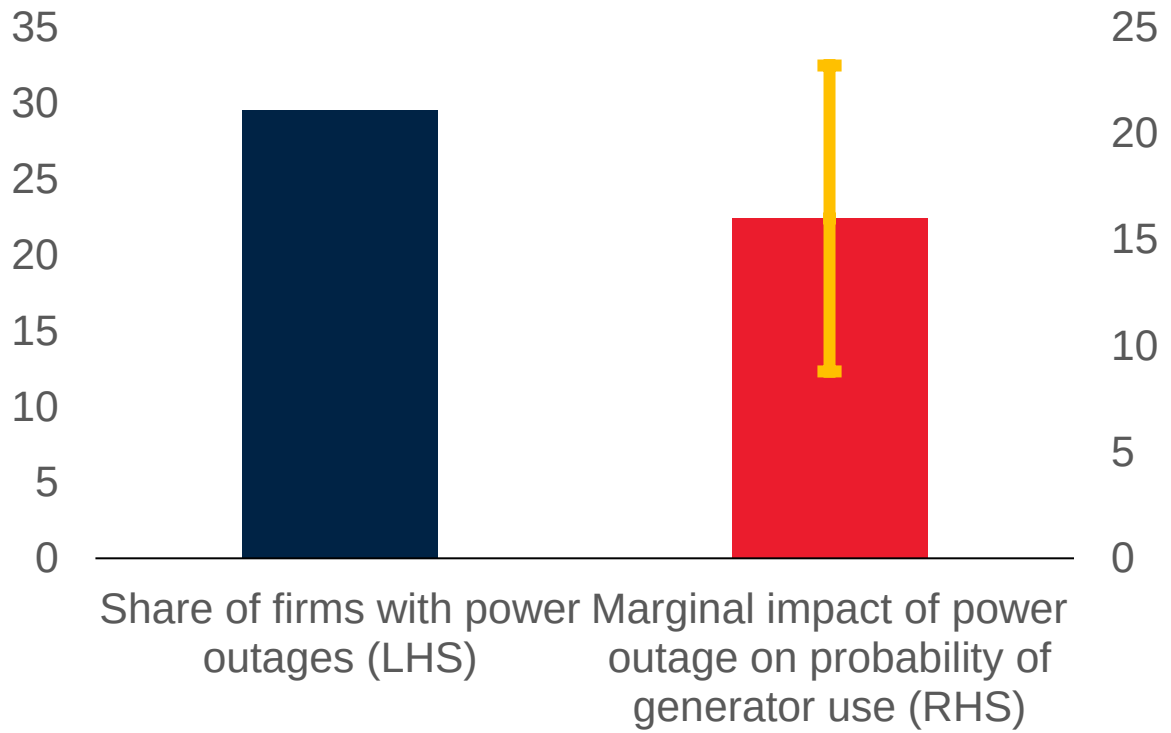
Establishments using generators

(Percent of firms)



Impact of power outages on generator use in India

(Percent of firms) *(Percentage points)*



Source: World Bank Firm Level Adoption of Technology Surveys

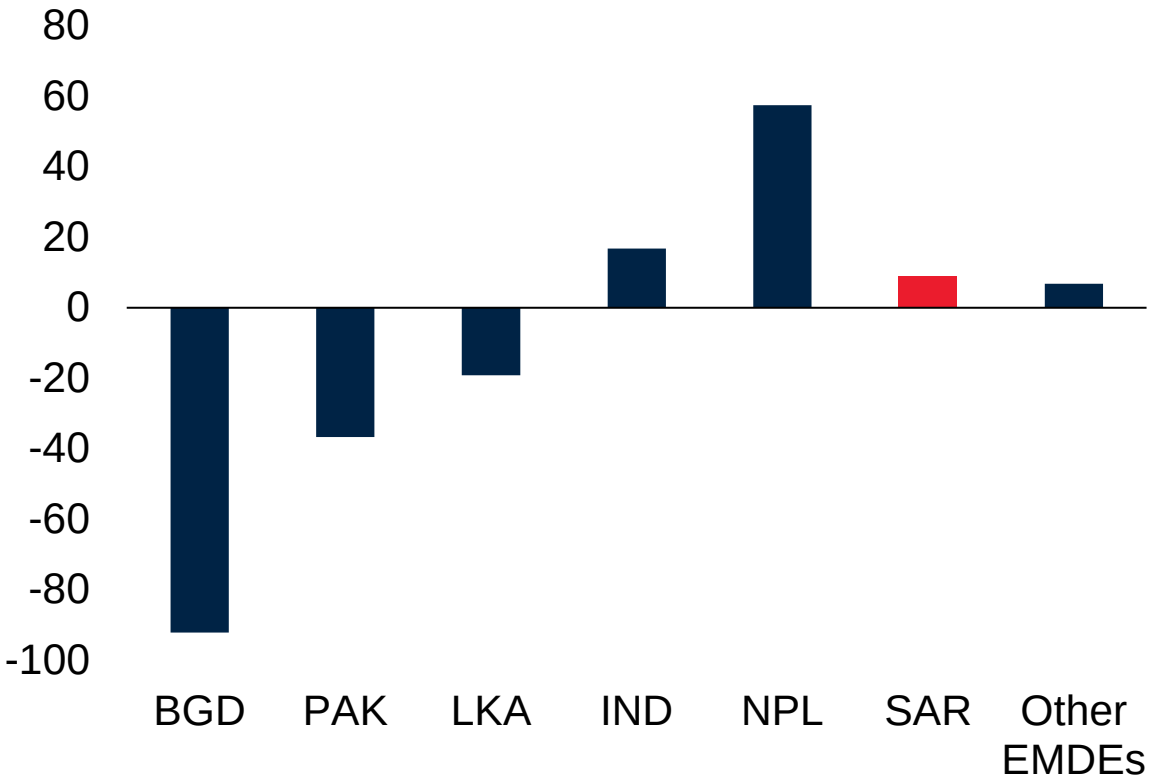
Includes World Bank's Firm Adoption of Technology (FAT) Surveys of 10,090 firms in seven EMDEs (Brazil, Bangladesh, Cambodia, Chile, Ethiopia, India, and Georgia). Depicts the range of country-level averages of percent of firms adopting technologies in SAR and other EMDEs.

Policy Options to Encourage Firm Technology Adoption

Getting Incentives Right

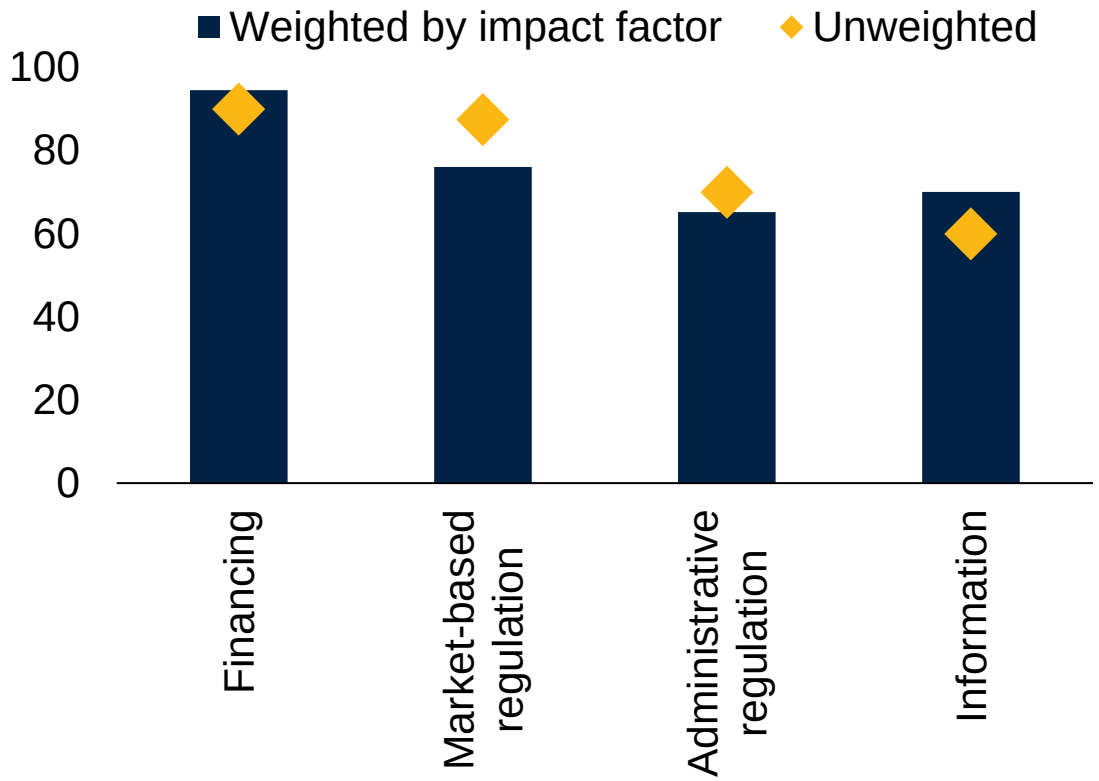
Total carbon price, 2021

(PPP U.S. dollars per ton of CO2)



Studies reporting successful green technology intervention

(Percent of studies)



Sources: Bangladesh leather goods and footwear RCT (Chaurey et al. 2023) (Left chart). Agnolucci et al. 2023 (Middle chart); World Bank (Right chart).

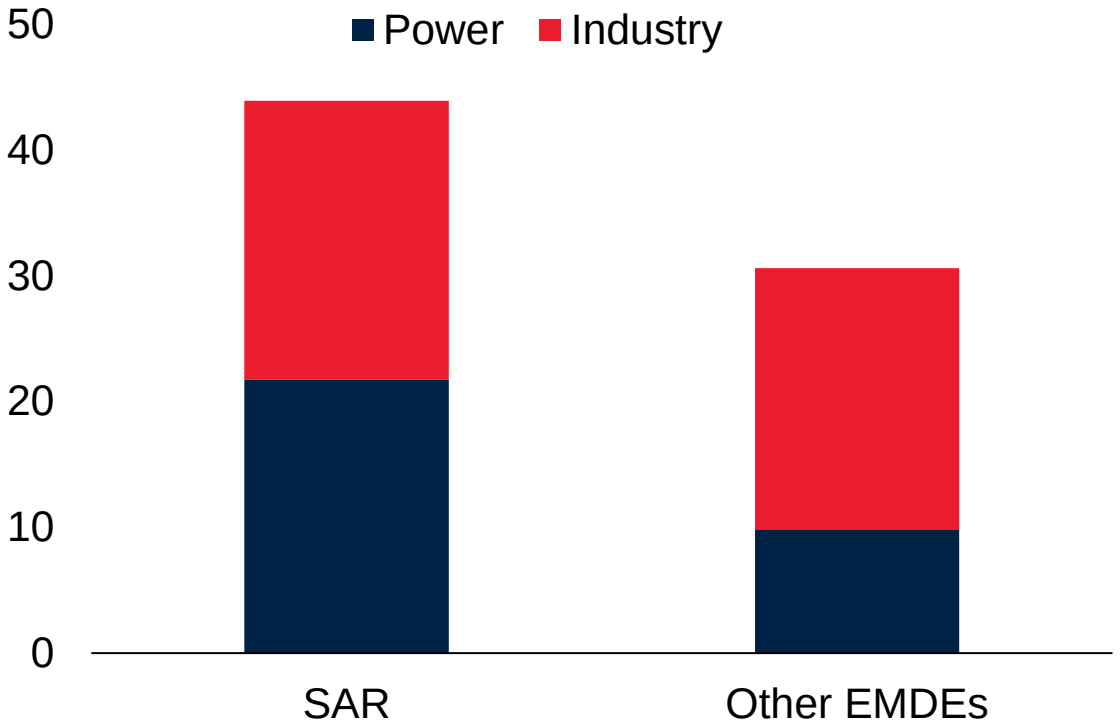
Left Panel: The total carbon price combines a comprehensive set of direct carbon pricing policies with indirect interventions on carbon-containing energy source to measure the aggregate carbon price signal faced by agents in the economy. A negative price is a net subsidy on carbon, while a positive price is a tax. SAR and EMDE averages are emissions-weighted. Right Panel: Based on results from a review of 45 academic and policy studies on the impact of specific policy interventions (regulation, information/behavioral, and finance) on either firm technology adoption or firms' energy efficiency. Impact weighting according to the RePEc ranking of the journal of working paper series in which the study was published.

Collateral Benefits of More Energy-Efficient Technologies

Less Pollution, More Jobs

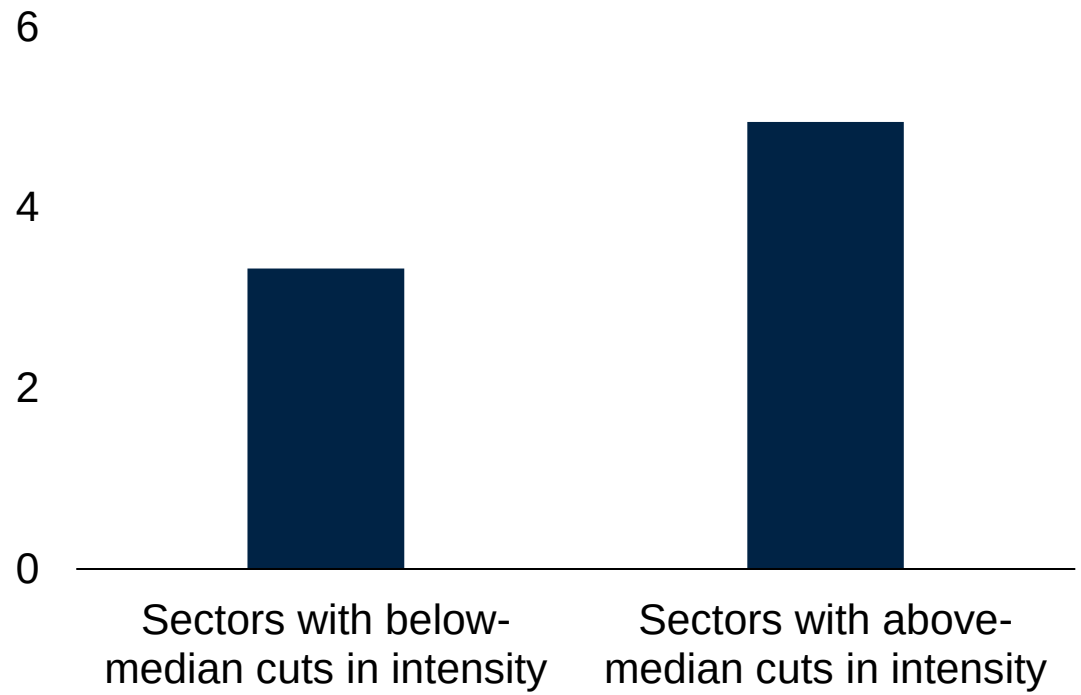
Contribution of power and industry to PM2.5 emissions, 2018

(Percent of PM2.5 emissions)



India: Employment growth, by decline in energy intensity, 2001-18

(Percent per year)



Sources: European Commission EDGAR database; Annual; Survey of Industries, India; World Bank.

Left Panel: "Power" includes industries with "Main Activity Electricity and Heat Production", "Industry" includes "Manufacturing Industries and Construction", "Glass Production", and "Other Process Uses of Carbonates". Share in total PM2.5 emissions in South Asia ("SAR") and other EMDEs. Latest data for 2018. Right Panel: The measure of electricity (or energy) intensity is the ratio of energy expenses to the total wage bill of each firm. Chart depicts the annual employment growth rate between 2001 and 2018 in 23 manufacturing sectors grouped into those with below-median and above-median cuts in sector-level energy intensity. The difference is statistically significant.

Two Questions

1 **What can spur investment in energy efficient technologies?** *SAR's energy intensity is twice the global average, firms lag in adopting advanced technologies. Regulation, financing, information can help*

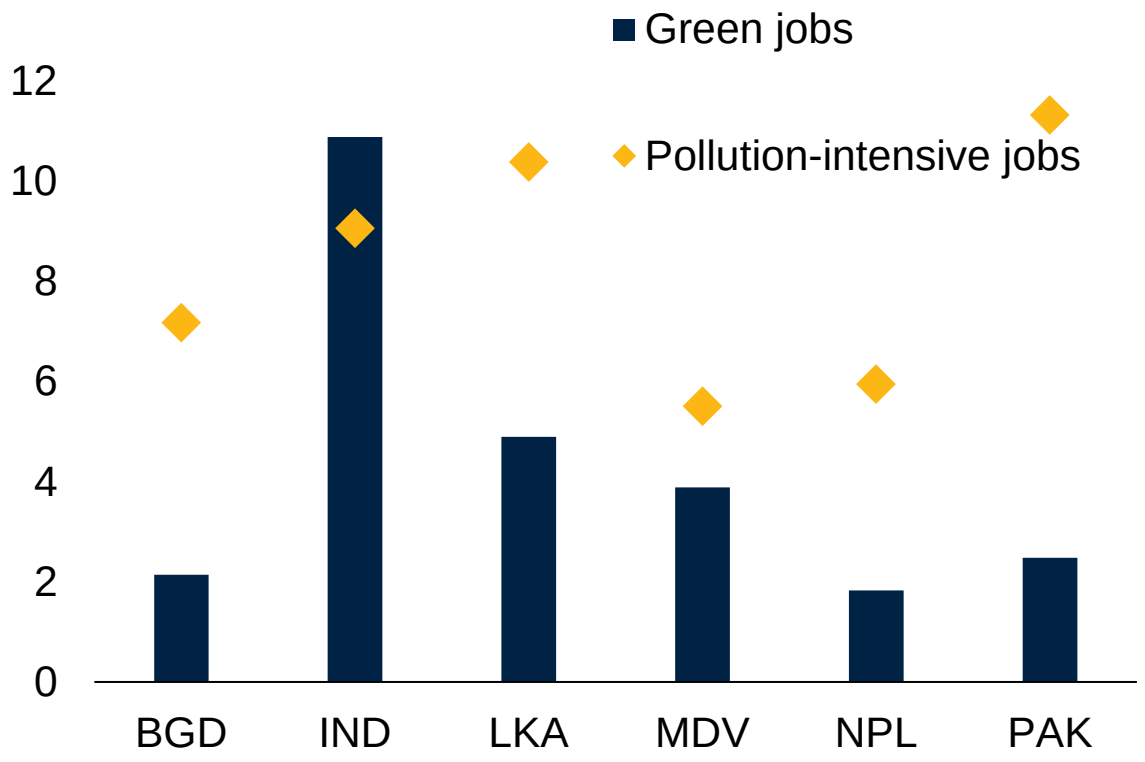
2 **How will the energy transition shape labor markets?** *Most SAR countries have more pollution-intensive than green jobs. Policies need to boost job creation and help workers, regions adjust.*

Pollution-Intensive Jobs

More, in Fewer Sectors, Than Green Jobs

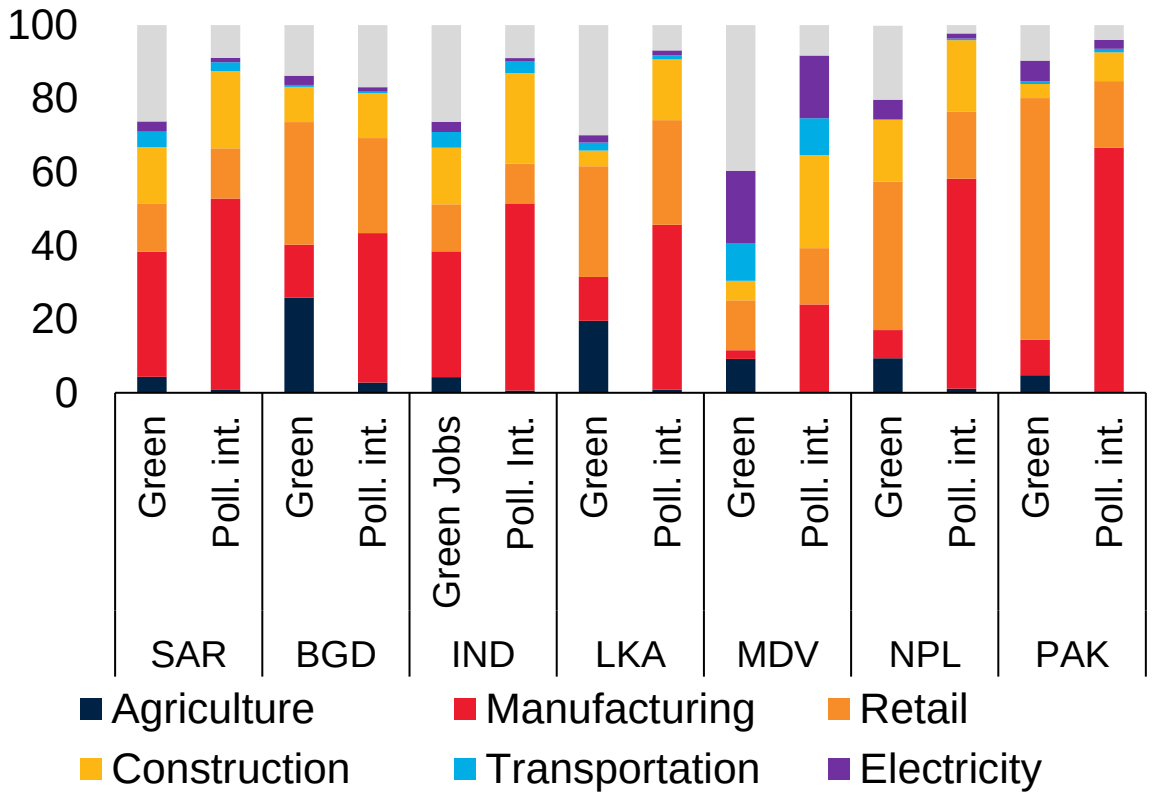
Share of green and pollution-intensive jobs

(Percent of workers)



Share of green and pollution-intensive jobs

(Percent of jobs)



Source: National statistical offices, World Bank.

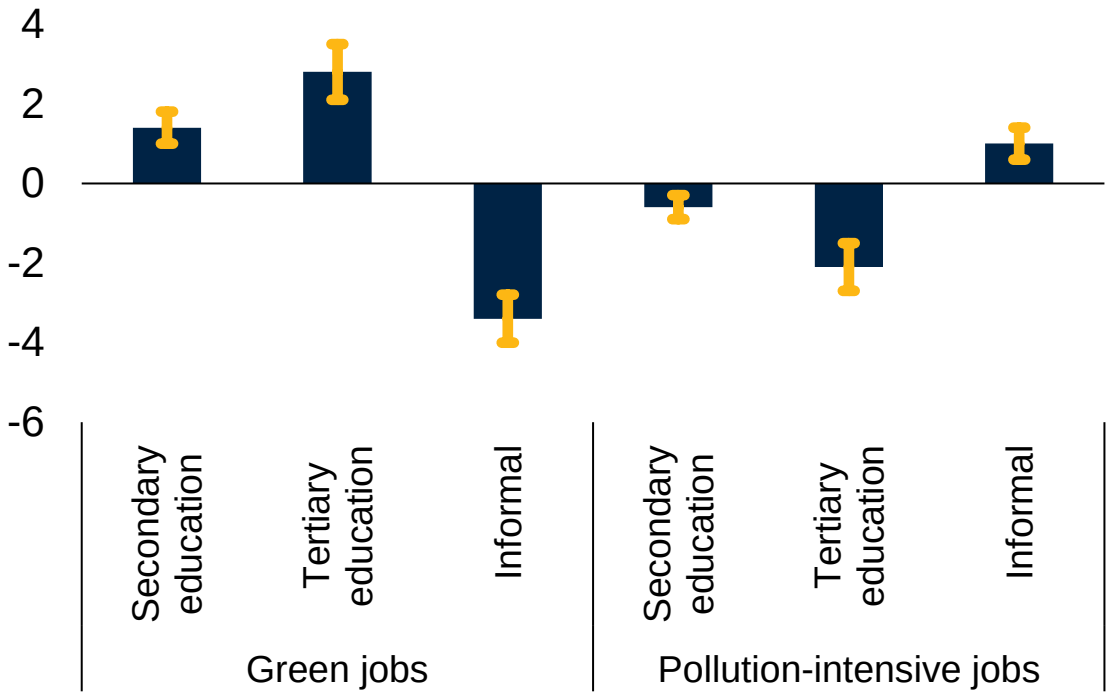
Note: Green jobs are those in occupations with a positive share of environmentally friendly tasks as defined in Granata and Posadas (2022). Pollution-intensive jobs are those in the most common occupations (at the 6-digit IOSCO level) in the five percent of industries that have the highest emissions of pollutants per worker as in Vona et al. (2018; annex 2). Labor force surveys are available for India (2018), Pakistan (2018), Maldives (2019), Sri Lanka (2019), Nepal (2017), and Bangladesh (2015).

Pollution-Intensive Jobs

Less-Educated, More Informal Than Green Jobs

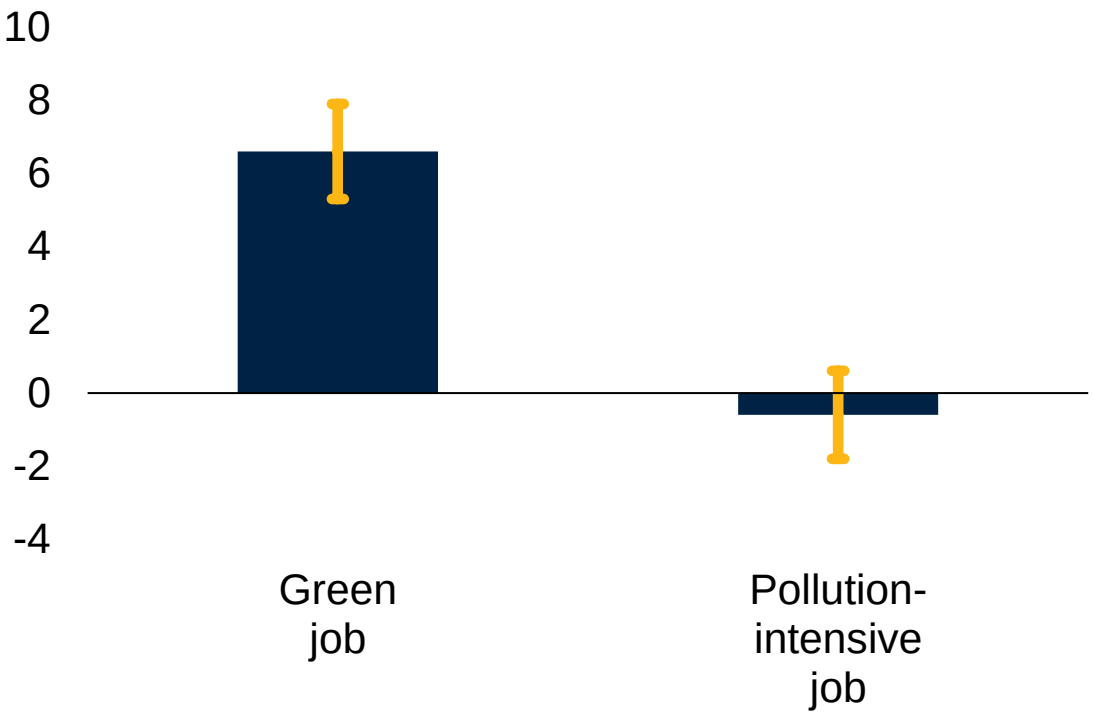
Marginal probability of worker characteristics in green jobs relative to other workers

(Percentage points)



Wage premium relative to average workers

(Percent)



Source: National statistical offices, World Bank.

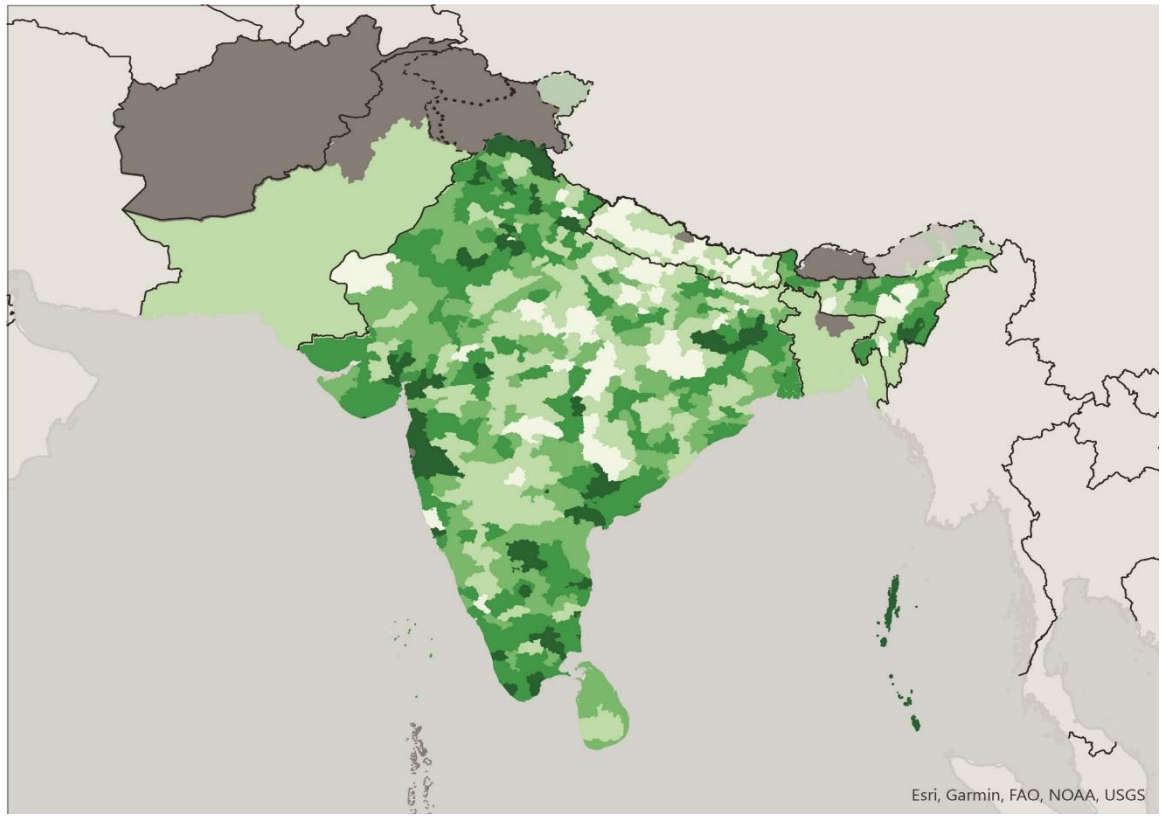
Note: Green jobs are those in occupations with a positive share of environmentally friendly tasks as defined in Granata and Posadas (2022). Pollution-intensive jobs are those in the most common occupations (at the 6-digit IOSCO level) in the five percent of industries that have the highest emissions of pollutants per worker as in Vona et al. (2018). Labor force surveys are available for India (2018), Pakistan (2018), Maldives (2019), Sri Lanka (2019), Nepal (2017), and Bangladesh (2015). Standard errors are clustered at the district/state level. Whiskers denote 95 percent confidence intervals. Industry fixed effects are included; for Indian, Maldives, Nepal, and Sri Lanka, country-by-district fixed effects included; for Bangladesh and Pakistan, country-by-state fixed effects included. For Maldives, urban denotes capital city. Standard errors are clustered at the district/state level. Whiskers indicate 95 percent confidence intervals. The reference group are workers with primary education aged 15-24 years. Left Panel: Probit estimates of the probability of having a green or pollution-intensive job. Right Panel: Estimates of percent difference between log wages in green jobs from wages elsewhere, based on a least squares regressions. Explained difference includes education, age, potential experience, urban residence, informality, industry, district/state. PPP adjustment for relevant years from WDI. The reference group are workers with primary education aged 15-24 years. Regression also controls for potential experience defined as age – years of education (inferred based on highest level completed)

Pollution-Intensive Jobs

More Geographically Concentrated than Green Jobs

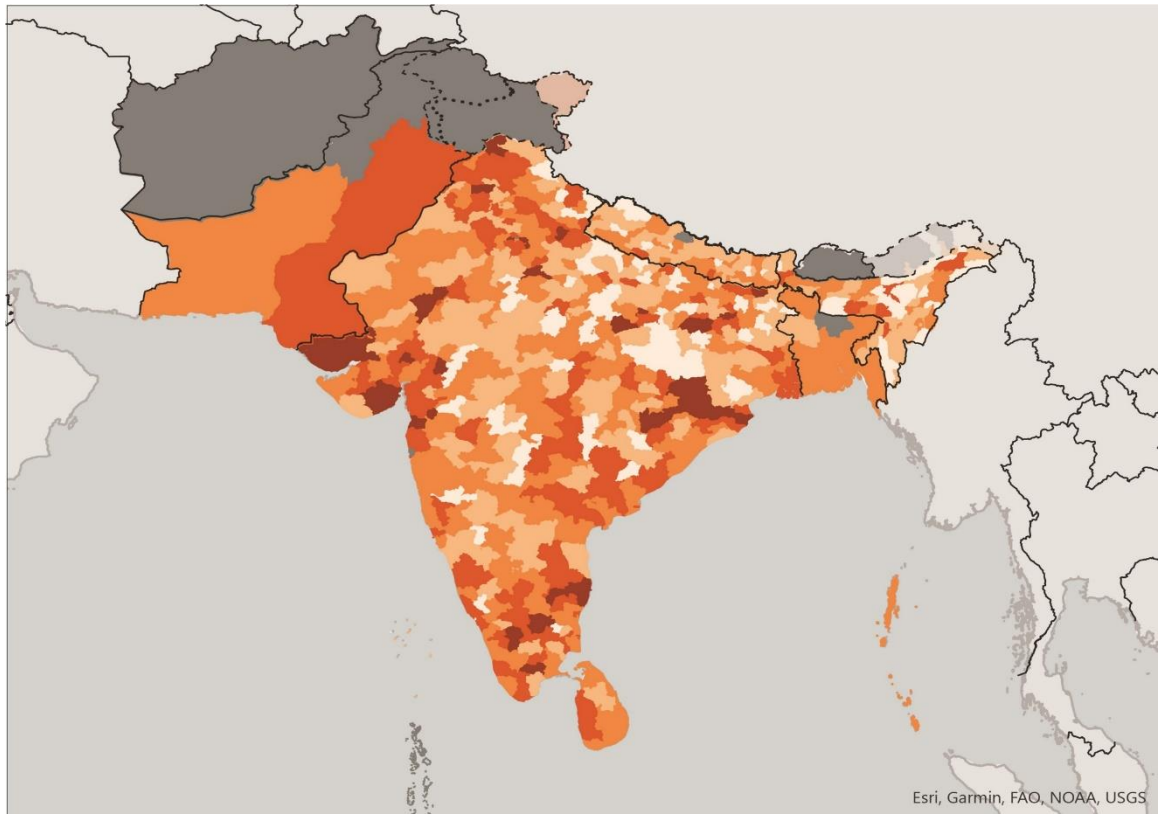
Share of green jobs

(Percent of subnational region's workers)



Share of pollution-intensive jobs

(Percent of subnational region's workers)



Source: National statistical offices, World Bank.

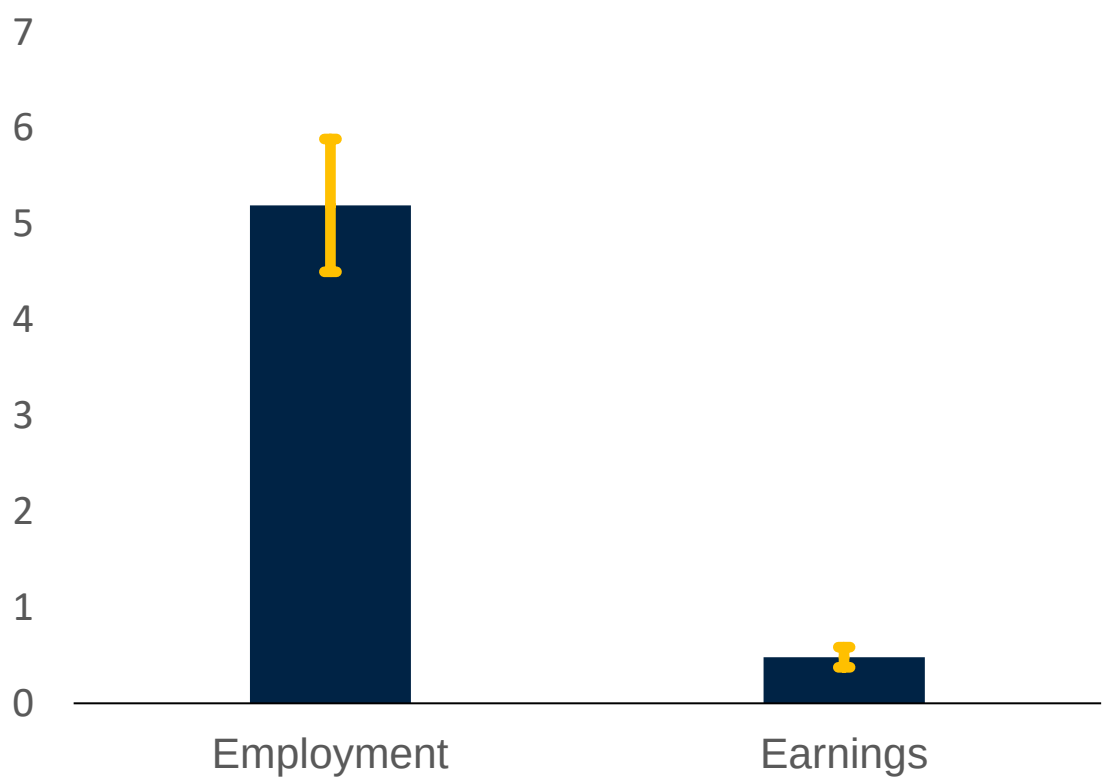
Note: Green jobs are those in occupations with a positive share of environmentally friendly tasks. Pollution-intensive jobs are those with above-median pollution intensity. Labor force surveys are available for Bangladesh (2015), India (2018), Sri Lanka (2019), Maldives (2019), Nepal (2017), and Pakistan (2018). A deeper color indicates a larger share of local workers employed in green or in pollution-intensive jobs.

Lessons from History: Resource Booms and Busts

Transient Gains, Persistent Losses

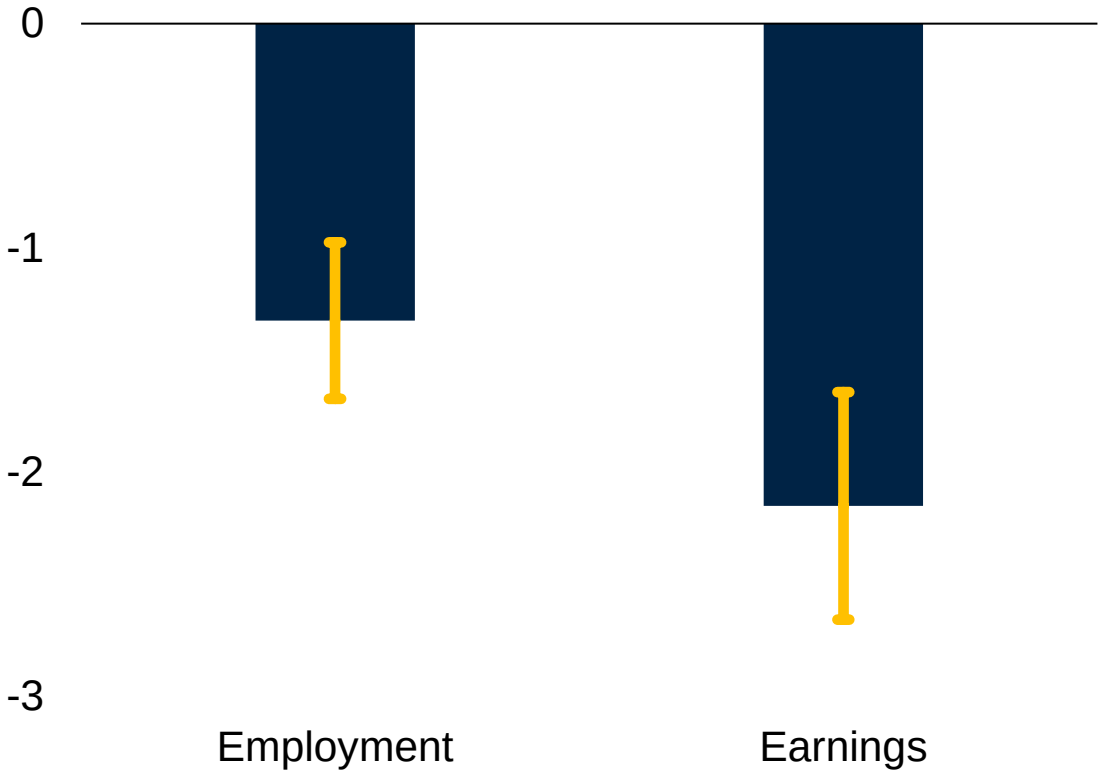
Changes during resource booms

(Percent)



Changes during resource busts

(Percent)



Sources: Calculations based on Aragón, Chuhan-Pole, and Land (2015), Marchand and Weber (2018), and related studies

Note: Estimates are based on random effects meta regressions. Each study's effect size is standardized to percentage changes. Log changes are interpreted as percentage changes. Employment measure is total employment in the labor market considered by each study. Earnings include earnings per worker, family earnings, wage and salary income, GDP per capita, total wages, annual pay, household income, median income, median earnings, and per capita expenditure.

Two Questions

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Thank you!

October 2023 South Asia Development Update

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Box 1.	Fiscal deteriorations around elections
Spotlight.	When life gives lemons: Making the best of debt default
Chapter 2.	Recruiting firms for the energy transition
Chapter 3.	Stranded workers? The energy transition in South Asia's labor markets

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Toward Faster, Cleaner Growth in South Asia

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