

April 2023




REAL TIME LABOR MARKET DATA- THE NEW FRONTIER?

Real-time labor market information, such as online job postings, has started to fill a critical information gap for labor market stakeholders. Access to up-to-date and granular data on job skills requirements, occupations in demand, and the changing nature of jobs is increasingly important for policymakers, employers, jobseekers, students, career and job counselors, and researchers alike. The proliferation of big data techniques allowed to access and analyze real-time labor market data, providing valuable, and previously much harder to obtain, insights on labor market dynamics and trends and informing evidence-based policymaking better tailored to the needs of a wide range of stakeholders.

While online job posting data is promising, with rich insights, it has limitations. For instance, in contrast to traditional labor market information, online job postings, in most cases, is not representative of the overall labor market; it tends to be biased towards specific sectors, occupations, firm size, skill level, and even geographic coverage. This partial coverage is particularly acute in contexts where online job postings are not as widespread (World Bank, 2022), while in others, as Cammeraat & Squicciarini (2021) show, such data can be exploited better, with extensive validation with traditional labor market data. Other challenges include limitations in the information captured in job vacancies, data quality, and other potential biases, which can be hard to overcome.

While relatively recent, the use of online job posting data to answer specific questions on labor issues has gained traction with rapid growth in the last few years. The start of this strand of literature dates to around the 2010s, mainly using U.S. data from Burning Glass Technologies, and has since expanded rapidly to other countries and topics. A series of studies (such as Deming and Kahn, 2018; Brancatelli et al., 2020; Cunningham et al., 2022) have shown how labor markets have evolved in terms of skills requirements, occupations, type of occupations and task content (e.g., non-routine cognitive) (Atalay et al., 2020), among others. A few researchers used this data source to

provide timely insights into how COVID-19 was impacting labor markets soon after the outbreak (Campos-Vazquez et al., 2021; Forsythe et al., 2020), reinforcing the vital importance of this source at a time when traditional surveys were suddenly halted in many countries and where even a few months old traditional data was rapidly losing relevance. Others have used this source to uncover labor market dynamics and challenges, such as explicit gender discrimination (Kuhn & Shen, 2013), empirical relationships between labor market tightness and skill requirements (Modestino et al., 2016), the impact of geographic location on job search (Marinescu & Rathelot, 2018), use of remote work with during Covid-19 (Hansen et al, 2023) among others. Lastly, some researchers are studying this type of data's statistical properties and proposing solutions to overcome some of the limitations mentioned above (e.g., lack of representativeness).

Real-time labor market data is undoubtedly a key source of information that can support development work towards more, better, and inclusive jobs. Even with its limitations, real-time labor market data can significantly enrich labor market monitoring and analysis. This data can be used to inform: (i) active labor market programs and workforce development policies to reduce skills mismatches and better align skills supply and demand; (ii) local economic development strategies; and (iii) equal employment opportunities policies and anti-discriminatory programs (including gender, age, race, and ethnicity), among others. This covers mostly the aggregate development perspective, but multiple stakeholders can use the information if this is presented adequately to different audiences. For instance, students can make more informed decisions about their field of study (e.g., Deming & Noray, 2020, show the earning dynamics and changing skills for STEM careers); job seekers and employers can identify skills demanded in a particular occupation; researchers can produce new evidence and expand the knowledge frontier by exploiting new datasets, among others.

This is a rapidly growing field that holds much promise. We hope our attempt to capture some key elements will encourage you to explore further (and maybe dive in to formulate and analyze your burning question).

Happy reading!



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FEATURED STUDIES IN THIS DIGEST

Changing Job Skills in a Changing World. In Handbook of Computational Social Science for Policy

Napierala & Kvetan | Book Chapter | January 2023

Mitigating skills shortages considering emerging labor trends –such as digitalization and green transition- requires an adequate response from key stakeholders. However, recommendations built upon traditional data sources, which lack granularity or are available with a significant time lag, may not address the emerging issues rightly. This chapter draws on experience setting the European Centre for the Development of Vocational Training project based on big data and presenting case studies to show the potential of using nontraditional sources of information in addressing research questions related to changing skills in a changing world.

Skill Requirements Across Firms and Labor Markets: Evidence from Job Postings for Professionals. Journal of Labor Economics

Deming & Kahn | Journal Article | May 2018

The study focuses on skill demands for professionals across firms and labor markets. It categorizes a wide range of keywords found in job ads into ten general skills. There is substantial variation in these skill requirements, even within narrowly defined occupations. Focusing particularly on cognitive and social skills, the research finds positive correlations between each skill and external pay and firm performance measures. Additionally, it finds evidence of a cognitive social-skill complementarity for both outcomes.

Remote Work across Jobs, Companies, and Space

Hansen et al. | Working Paper | March 2023

The pandemic catalyzed an enduring shift to remote work. The study examines more than 250 million job vacancy postings across five English-speaking countries to measure and characterize this shift. From 2019 to early 2023, the share of postings that say new employees can work remotely one or more days per week rose more than three-fold in the US and by a factor of five or more in Australia, Canada, New Zealand, and the UK. The findings show a high degree of heterogeneity in remote work adoption across cities, industries, and occupations rooted in underlying factors -local norms, workers' preferences, etc.- which could be a potential topic for future research.

The Evolution of Work in the United States

Atalay et al. | Journal Article | 2020

Using the text from job ads, the article introduces a new dataset to describe the evolution of work from 1950 to 2000. It shows that the transformation of the US labor market away from routine cognitive and manual tasks and toward nonroutine interactive and analytic tasks has been larger than prior research has found, with a substantial fraction of total changes occurring within narrowly defined job title. The study provides systematic evidence on changes in task content within job titles and on the emergence and disappearance of individual job titles.

OTHER ESSENTIAL READINGS ON THE TOPIC

Earnings Dynamics, Changing Job Skills, and STEM Careers

Deming & Noray | Journal Article | November 2020

This article studies the impact of changing job skills on career earnings dynamics for college graduates. We measure changes in the skill content of occupations between 2007 and 2019 using detailed job descriptions from a near universe of online job postings. We then develop a simple model where the returns to work experience are a race between on-the-job learning and skill obsolescence. The study shows that the earnings premium for college graduates majoring in technology-intensive subjects such as computer science, engineering, and business declines rapidly and that these graduates sort out of faster-changing occupations as they gain experience.

Burning Glass Technologies' Data Use in Policy-relevant Analysis: An Occupation-level Assessment

Cammeraat & Squicciarini | Report | 2021

This work proposes an analysis of the statistical properties and distributional characteristics of Burning Glass Technologies' (BGT) data on online job openings from platforms and companies at the occupation level. BGT data are compared to official data on employment by occupation to assess their occupation-specific representativeness. This work further proposes weighting schemes to make BGT-based analysis fully representative at the occupation and country levels, where appropriate. BGT data shows good statistical properties and is a valuable source of timely information about labor market demand, especially for high-skill occupations and online recruitment processes.

The Demand for Digital and Complementary Skills in Southeast Asia

Cunningham et al. | Working Paper | May 2022

This paper uses online job postings data from Malaysia to identify the digital, cognitive, and socioemotional skills required for digital and non-digital occupations. The skills profiles for each occupation are then merged with labor force survey data from Cambodia, Malaysia, Thailand, and Vietnam to sketch skills profiles of the workforces in these countries. Using descriptive statistics and linear probability model regressions, the paper finds evidence that highly digital occupations require not only digital skills, but also cognitive and socioemotional skills. The data also confirm that the bulk of employment in Southeast Asia is in low or medium-digital occupations.

Labor Demand in the Time of COVID-19: Evidence from Vacancy Postings and UI Claims

Forsythe et al. | Working Paper | April 2020

The paper uses job vacancy data collected in real-time by Burning Glass Technologies, unemployment insurance (UI) initial claims, and the more traditional Bureau of Labor Statistics (BLS) employment data to study the impact of the COVID-19 pandemic on the labor market. The research finds that job vacancies collapsed in the second half of March, and by late April, they had fallen by over 40%. UI claims and BLS employment data also largely match these patterns. Mainly all industries and occupations saw a contraction in postings and spikes in UI claims, with the minor difference depending on whether they are deemed essential and whether they have the work-from-home capability.

Gender Discrimination in Job Ads: Evidence from China. The Quarterly Journal of Economics

Indonesia's Online Vacancy Outlook: From Online Job Postings to Labor Market Intelligence 2020

This research studies explicit gender discrimination in a population of ads on a Chinese Internet job board. Gender-targeted job ads are common, favor women as often as men, and are much less common in jobs requiring higher skill levels. On the other hand, employers' relative preferences for female versus male workers are more strongly related to the preferred age, height, and beauty of the worker than to job skill levels. Almost two-thirds of the variation in advertised gender preferences occurs within firms. These patterns suggest a model in which firms have idiosyncratic preferences for particular job-gender matches, which are overridden in skilled positions by factors such as thinner labor markets or a greater incentive to search broadly for the most qualified candidate.

The objective of this technical report and the accompanying skills profiles report is twofold. First, the technical report explains the methodology used to transform job postings text into OV data and in turn, illustrates how to use those data to produce labor market intelligence valuable to different users. Second, the report presents answers to questions often asked by end-users and policymakers. This work is part of a series produced by the World Bank to support the Government of Indonesia in strengthening its labor market information system (LMIS). The OVO presents the results of one of four data pilots that, if adopted by the government, will provide the information needed to fill in important data gaps and to provide key labor market intelligence services to different users.

RECENT PAPERS ON THE BROADER JOBS' AGENDA

Experimental Evidence on the Productivity Effects of Generative Artificial Intelligence

Noy & Zhang | Working Paper | March 2023

The paper examines the productivity effects of a generative artificial intelligence technology—the assistive chatbot ChatGPT—in the context of mid-level professional writing tasks. The results show that ChatGPT substantially raises average productivity and decreases worker inequality, as ChatGPT compresses the productivity distribution by benefiting low-ability workers more. ChatGPT mainly substitutes for worker effort rather than complementing worker skills and restructures tasks towards idea generation and editing and away from rough-drafting. According to the study, exposure to ChatGPT increases job satisfaction and self-efficacy.

Hard and Soft Skills in Vocational Training: Experimental Evidence from Colombia

Barrera-Osorio, Kugler, & Silliman | Journal Article | March 2023

This paper uses survey and administrative data to study the effects of an oversubscribed job-training program on skills and labor-market outcomes. Overall, vocational training improves labor-market outcomes, particularly by increasing formal employment. A second round of randomization evaluates how applicants to otherwise similar job-training programs are affected by how hard versus soft skills are highlighted in the curriculum. Admission to a vocational program emphasizing technical relative to social skills generates more significant short-term benefits. Still, these relative benefits quickly disappear, putting participants in the technical training on

equal footing with their peers from the soft-skill training in under a year.

Trade Shocks, Population Growth, and Migration

Guerrico | Journal Article | February 2023

This paper examines the effect of trade-induced changes in Mexican labor demand on population growth and migration responses at the local level. It exploits cross-municipality variation in exposure to a change in trade policy between the United States and China that eliminated potential tariff increases on Chinese imports, negatively affecting Mexican manufacturing exports to the United States. Municipalities more exposed to the policy change via their industry structure experienced greater employment loss. In the five years following the change in trade policy, more exposed municipalities have experienced increased population growth, driven by declines in out-migration.

Does the Increase of Labor Protection Intensity Promote Regional Economic Growth? Evidence from China

Xu et al. | Article | September 2022

Using inter-provincial panel data from 1998 to 2012 and taking the implementation of China's new "Labor Contract Law" in 2008 as a quasi-natural experiment, this study uses the differences-in-differences empirical method to quantitatively analyze the impact of changes in labor protection intensity on local economic growth. The empirical results show that enhancing labor protection intensity can effectively promote economic development in regions with higher levels of human capital, especially the eastern developed areas in China. Further research shows that this promotional effect is more evident in the growth of the tertiary industry.

Technical Change and Wage Premiums Amongst Skilled Labour: Evidence from the Economic Transition

Alexeev | Article | April 2022

The demand behavior is identified with a new skill-biased technical change model of demand for skills with three production inputs (high school graduates and bachelor-level educations with two majors). This shows that a technology shift that favors a particular skill might emerge within the skilled group rather than between skilled and unskilled. This is relevant because similar changes emerge today in the frontier economies that adopt new general-purpose technologies. This paper informs policymakers today on tools to counteract a potential drop in economic equality and performance that results from this adoption.

The Economic Return to Labour Market Experience of Immigrants in Sweden

Tibajev | Article | March 2023

This study focuses on the value employers assign to immigrants' labor market experience, from before and after immigration, using a surveyed representative sample of the Swedish immigrant and native populations. The results also show that return to labor market experience after immigration does not depend on whether the individual acquired Sweden-specific human capital before or after entering the labor market. Natives and immigrants, as well as immigrants with and without schooling or upbringing in Sweden, have parallel wage trajectories across labor market experience years, with immigrants at a stable disadvantage. This may be caused by immigrants being sorted into jobs with worse opportunities to acquire new human capital than natives.

Wage Differences According to Workers' Origin: The Role of Working More Upstream in GVCs

Fays, Mahy, & Rycx | Paper | August 2021

This paper is the first to investigate the role of firm-level upstreamness (i.e. the number of steps before a firm's production meets final demand) in explaining wage differences according to workers' origin. Using an employer-employee data relative to the Belgian manufacturing industry, estimates show that firms further up in the value chain pay significantly higher wages. However, the wage premium associated with upstreamness is also found to vary substantially depending on the origin of the workers. Unconditional quantile estimates suggest that high-wage workers born in developed countries benefit the most from being employed in more upstream firms.

He Said, She Said: The impact of Gender and Marriage Perceptions on Self and Proxy Reporting of Labor

Dervisevic & Goldstein | Article | March 2023

Available labor statistics mostly come from surveys in developing countries, which rely on one person providing information about all household members. However, only a few empirical studies provide a framework for understanding the potential advantages and disadvantages of using self and proxy reporters to collect such data. Using self and proxy reports from surveys in Ghana, the research shows significant differences in estimated labor productivity with different implications in terms of policy-making. It underscores that differences in reporting are primarily based on gender and marriage satisfaction of self and proxy reporters. Hence, differences in reporting are due to bias and are not classical measurement errors.

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Want to share your recent publication or event for inclusion in our monthly newsletter? Email cfroy@worldbank.org

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