

Micro-Economies: The Economics of Informal Micro-Jobs

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Abstract: While the informal sector has traditionally been a feature of developing countries, consisting of street vendors, day laborers, and those working illegally, the diffusion of low-cost home technology, coupled with high unemployment in the United States has created a new informal sector that we refer to as the micro-job market. This sector includes revenue-generating bloggers and YouTubers, craftspeople selling their wares on eBay and Etsy, stock photographers, online freelance writers and software and web designers, and other such jobs. This paper presents some examples of micro-jobs, discusses the importance of attempting to measure the employment, output and productivity of this sector, and makes a plea for data collection.

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- **Introduction**

Technological advances have changed the workplace in many ways, but one change that has not received much attention is the creation of new informal labor markets. Informal labor markets are generally described as economic activities that are outside of the typical contractual and regulated labor markets. While traditionally these have included low-skill jobs, such as day laborers, roadside fruit stands, as well as illegal activities such as prostitution and drug dealing, the diffusion of personal computers to the majority of private households has opened up tremendous opportunities for a higher-skilled type of informal work that is performed at home. Today, there are numerous informal, micro-jobs that are facilitated by information technology, including paid survey-takers, stock photographers, Internet content writers, bloggers, and countless other jobs. For the most part, these are very small order jobs that do not add up individually to large amounts of income or hours worked. However, if millions of people are performing these jobs, often more than one per person, this can result in significantly under-measuring the output, employment and/or productivity of the economy.

Measuring the size of the informal sector is always difficult; currently there is very little information on how technological diffusion has affected the size of these markets. As an example, however, job posters on Amazon's Mechanical Turk offer workers sometimes as little as a penny, and rarely more than a dollar to perform tasks such as searching a keyword on Google, transcribing an audio file, or testing a button on a website. Estimates suggest that between \$10 million and \$150 million worth of transactions are conducted on Mechanical Turk in a year, with the numbers growing rapidly (Ipeirotis, 2012). The estimated hourly rate of pay is far below the \$7.25 per hour minimum wage, which implies that this work was performed using at least 1.4 million person-hours, and possibly as much as 42 million (assuming the higher value

of transactions, and a rate of pay of around \$3.50 per hour)¹. While these are very rough estimates of the magnitude of hours and income, there are hundreds of other employers in this informal micro-jobs labor market, suggesting that this sector may be large enough to affect aggregate estimates of output, employment, and productivity.

There are several reasons we might be interested in these new informal labor market transactions. One reason is to determine whether government statistics that measure the output and growth of the economy and the status of employment and wages are capturing these changes. While it may seem trivial if, for example, a housewife spends ten minutes filling out an online survey for a dollar, if there are millions such housewives, spending hundreds of thousands of hours filling out surveys for millions of dollars, it becomes an important contribution to the measure of labor input in the market research industry, to our measure of productivity in that industry, and to our measure of total employment and average wages for the economy as a whole as well as that industry.

A second reason for paying attention to these micro-jobs is a broader issue of the trends in worker well-being. What features of the current economy induce some workers to accept—either in addition to a regular full-time job or in place of—low-paying jobs, with limited hours, no contracts, no benefits, and no regulation? And are these features relatively more attractive to some demographic groups than others? It is our hypothesis that the growth of technology-linked micro-jobs has substantially changed the demographic composition of workers in the informal sector. Testing this hypothesis requires us to develop measures of the size of the changing informal market.

¹ Estimating total US employment of around 241 billion person-hours per year, Amazon Mechanical Turk could be the equivalent of .0001 percent of employment.

Finally, this information will help economists update their understanding of the link between technology and the informal sector, and help policy-makers determine whether current laws and regulations should apply to these informal arrangements. Economic analyses have long posited a negative relationship between the informal sector and GDP growth (e.g. Loayz, 1996). The policy implication of such academic work on the informal sector has been to improve GDP growth and broaden the tax base by improving government institutions and to permit movement of work into the formal sector. The growth of technology-dependent micro-jobs may alter both the relationship between GDP growth and the size of the informal sector and the implications that relationship has for policy. Some recent studies support a positive relationship between the informal sector and GDP growth (Nabi and Drine, 2009; Eliat and Zinnes, 2000; Birinci, 2013). In some countries, governments may want to support and encourage informal job markets—even at the expense of losing tax and licensing revenues. In other places, however, the government may attempt to regulate or eliminate such markets, in order to reduce the loss of revenues or to protect workers and consumers from harm.

This paper supplies motivation for an effort to collect data on micro-jobs, and to measure the importance of such jobs to the economy. In the next section, we discuss micro-jobs in the context of economic studies on the informal sector. We then look at how, specifically, this sector does or does not appear in official statistics measuring the economy, using specific examples. Lastly, we discuss data collection needs and conclude.

- **Understanding Micro-work as Work in the Informal Sector**

According to Portes and Sassen-Koob (1987), the informal sector includes “all those work situations characterized by the absence of (1) a clear separation between capital and labor;

(2) a contractual relationship between both; and (3) a labor force that is paid wages and whose conditions of work and pay are legally regulated (Moser 1978; Portes and Benton 1984).”

Informal markets have traditionally arisen and thrived in economies with an abundance of available labor and weak labor organization. Historically, this has resulted in informal markets being more prominent in developing countries than in the United States; however recent economic trends in the United States—multiple economic downturns with slow job recovery and decreased unionization—have favored an increase in informal employment.

Few researchers have studied the modern evolution of informal sectors in the United States. To our knowledge, there are no studies that attempt to quantify the size of the new, technology-driven micro-jobs relative to other informal work or to the informal sector as a whole. This is in part due to the fact that aggregate measures of the informal sector rely on broad indicators, like the labor force participation rate and the use of currency relative to the overall money supply (Buehn and Schneider, 2012).

Smith (1987) attempts to measure the size of the informal retail (i.e., street vendors) sector. He argues that such data cannot reliably be collected from the vendors themselves, because they “frequently operate at the margin of conformity with requirements for licensing, permit filing, and performance codes.” He instead reports the results of a survey of consumers, finding that \$42 billion of informal activity took place in 1981, with four of five households reporting that they had purchased something from an informal vendor. In considering how to measure the informal micro-job sector, it may be similarly important to determine whether the most reliable source of data come from the “employer” or the “employee”.

There are a great number of studies on the informal sector in developing and less developed markets. The International Labour Organisation issued several reports in the 1970s

describing a tremendous growth in small-scale, mostly family-operated informal businesses in Third World countries. (ILO 1974, 1975a, 1975b, 1976) These are similar to micro-jobs mainly in scale, irregularity of hours and wages, and lack of regulation; however, these businesses usually require extremely minimal physical capital investment, and are usually based on personal relationships between the worker and the employer. (Gerry, 1987) According to La Porta and Shleifer (2008), about half of all economic activity in developing countries comes from the informal sector. Although it is sometimes suggested that informal sector workers are capable of being just as productive as formal sector workers, but are merely held back by barriers to entry in formal markets (De Soto, 1989), research generally supports more of a dual labor market view—economic growth and job growth comes about through the formal sector, with the informal sector being important mainly for those who do not have the skills to participate in the formal sector. (La Porta and Shleifer, 2008)

Policy approaches to dealing with the informal sector fall into four broad categories, as described in Miller (1987): “drive them out, make them pay up, improve them, and expand them”. Proponents of restricting the informal sector believe that such unregulated transactions are harmful to the economy—either through lost tax and licensing revenues, through workers employed in less productive ways than possible in the formal markets, or through increased risk to consumers or workers due to the lack of regulation. However, it has typically been difficult to restrict the informal sector (Miller, 1987)—a strong economy seems to have the natural effect of reducing the incentives for informal work. Efforts to improve or encourage the informal sector include: stricter enforcement of minimum wage laws, extension of unemployment benefits to those in the informal sector, increasing the access to small business loans, etc. The approach that policy-makers choose will depend in large part on understanding the nature of the informal

sector—how large is it, what are the demographic characteristics of its workers, what industries and occupations does it cover, and why do these transactions take place in the informal sector rather than through formal markets.

- **Measuring Micro-work**

There are three specific areas where both micro-work and other transactions in the informal sector should appear in government measures of economic activity: employment, output, and productivity. It is likely that some or all of such transactions are missing from each of these estimates.

Estimates of employment are mainly obtained from either population surveys, such as the Current Population Survey (CPS) or the long form of the decennial Census, recently replaced with the American Community Survey (ACS); or from establishment surveys, such as the Current Employment Statistics (CES). In the case of the CPS and ACS, survey respondents are asked whether they were doing any work for pay or profit last week. If they respond that they did work, they are asked follow-up questions about their job. Additionally, the CPS asks about secondary job-holding. However, it is up to the respondent to determine whether to count their blogging activities or their paid survey-taking or any other activity as employment. Unfortunately, we do not have any explicit data, so it is impossible to know whether survey respondents would include such activities in their responses, although it seems somewhat unlikely. The CES data count payroll employees at private-sector businesses. By definition, this does not include informal sector workers, who are not regular, payroll employees. Thus, it is fairly likely that the majority

of employment and hours performed in informal sector work is uncaptured in any government estimates of employment.

The output of the informal sector is somewhat more complicated. Depending on the nature of the transaction, it may or may not need to be counted in aggregate measures of economic activity. While some micro-jobs produce final goods and services for sale to consumers, many products and services that are produced by these jobs are intermediate goods that are used as inputs towards producing other final goods and services. To that extent, the output need not be counted in the measurement of National Accounts. It is, however, still important for measures of inputs and outputs by industry.

For the most part, data on economic output used in measuring the size of the economy and in creating industry input-output tables are obtained from the periodic Economic Censuses, which are surveys of businesses. To be included in the survey, the business must have an Employer Identification Number, or EIN. Micro-job workers are essentially self-employed contract workers; since they do not have an EIN, output they produce, such as photos they sell online or YouTube videos that other companies buy advertising space on, is not counted by any Economic Census. The National Accounts do also account for self-employed workers by including nonfarm proprietor's income, obtained from IRS income tax records. It is fairly likely that many informal job holders do not report their income to the Internal Revenue. The BEA makes an adjustment for non-reporting, but it is unclear whether that may capture the income from micro-jobs. Thus, although much of the output from informal sector transactions is correctly excluded from the National Accounts, there undoubtedly remains a fraction of it that should be included and is not captured by current data collection. Additionally, a larger fraction is missing from the industry input-output matrices.

If both the output of the informal sector and the labor that went into producing it are omitted from our aggregate measures, the resulting productivity measures will be unbiased. This is true for a small informal vendor, for example, who produces and sells craft goods directly to consumers. Neither the sales transactions nor the hours of labor that produced the goods are measured. On the other hand, to the extent that the output is counted (either explicitly, or as an intermediate input to a final output that is then counted), while the labor is not counted, productivity will be overstated. What seems to have been produced with a given, measured amount of labor was actually produced with a greater amount of the labor input. Moreover, if this were approximately constant over time, it would not affect productivity growth; but the apparent increase in micro-jobs for the past decade or so suggests that productivity growth itself may be overstated. The extent of this overstatement depends on the size of the informal sector, making it important to begin to find ways to measure it.

- **Specific Examples of Micro-Jobs**

Holts (2013) shows that there is no clear taxonomy of “virtual work.” Creating such a taxonomy must necessarily confront the overlap of uses for information technology. For example there is an intersection between online games and work. Furthermore, online work is done both on a volunteer basis as individuals provide a public good (for example contributing reviews to TripAdvisor or Yelp, or moderating an online forum or game) and on a compensated basis. Thus, work providers are motivated by a mix of: contributing to the public good, entertainment provided by the work, and monetary compensation. Nonetheless, many micro-jobs are simply occupations that have long existed but are now facilitated by technology.

Some micro-jobs are similar to the traditional street vendors and craft workers that have always characterized the informal sector, producing final goods or services for immediate consumer use. These include people who manufacture goods on a very small scale; for example jewelry and hand-sewn or knitted apparel sold on Etsy or Ebay, or self-published books offered on Amazon. Unless these reach a fairly high volume, the output, which should be counted in one of the manufacturing sectors, is not included in national totals. What is new about the current informal craft workers is that technology has allowed them much greater ability to connect with their customers, and to expand their market beyond their immediate neighborhood.

According to Entrepreneur magazine, Etsy's 25 million members sold over \$895 million in goods in 2012, which was an increase of over 70 percent from the previous year. Ebay's sales are in the tens of billions annually, although a larger share of those sales come from larger business enterprises than on Etsy. Although craft workers have the added complication and effort of shipping their items to various locations, they do not have to pay the types of licensing and overhead costs they might have to pay at a craft fair or a farmer's market or elsewhere.

The diffusion of personal computers has also facilitated the informal micro-production of other types of digital products, such as self-published books and stock photography.

Amazon.com is the primary location where self-published books are housed and sold. There are tens of thousands of authors whose work sells there, earning them as much as \$6.99 per \$9.99 book sold. There are a number of other self-publishing sites as well, with varying royalty rates.

Around 125,000 artists contribute digital photo images, illustrations, audio files and sound effects to iStockphoto's inventory; whenever their image is purchased by a customer, the artist receives a small royalty. As with other micro-jobs, while each single royalty is a minor transaction (15% of an average price of around \$40), the numbers are significant given the large

number of transactions: iStockphoto pays out \$1.9 million in royalties per week. According to BLS population surveys, non-self-employed photographers earned around two billion in wages in 2011²—this suggests that the size of iStockphoto’s employment (which includes a global pool of photographers) may be nearly five percent as large as the U.S. formal sector employment in this occupation. There are around 56,000 non-self-employed photographers, earning on average \$36,330 per year. As few as ten years ago, this type of informal production and sales of photographs was much more difficult, as a casual photographer would only be able to find customers among neighbors and co-workers and perhaps local businesses. Technological advances have removed the obstacles from this marketplace, bringing together customers and artists.

In addition to manufactured goods produced by informal workers and sold to consumers, there has also been a new type of informal service sector employment. Airbnb.com allows people with spare room in their house to rent out the room to visiting tourists, providing an informal bed and breakfast. Once again, the ease of digital marketplace transactions brings about this type of opportunity. On a typical peak season night, over 200,000 people stay in a room they found on Airbnb.com, comparable to a major hotel chain. To the extent that the owner of the property must clean, do laundry, and in some cases cook breakfast for their guests, this should be counted as labor input to the hospitality industry. Whether or not someone who rents a room on Airbnb.com would respond as such on a household survey is unknown.

Many other types of micro-jobs entail performing small tasks for businesses. In some instances, a company wants to contract out a single one-time job, such as transcribing a set of medical records, or writing a grant proposal. In other cases, the company needs a large number

² This rough estimate is based on a report of 56,000 photographers, earning an average annual salary of \$36,330.

of people to simultaneously perform a small task, as in crowd-sourcing. In the past, the business might hire temporary workers or add the tasks to current workers' job duties. With the diffusion of personal computers and other technology, companies can now recruit freelance workers online through a host of different freelance hosting sites, such as elance.com, guru.com, odesk.com, freelancer.com and through Amazon's Mechanical Turk. The number of registered freelancers at elance.com has increased from 1.5 million to three million just between 2012 and 2013. These workers compete for approximately 300,000 jobs posted by companies every quarter. Over half of these jobs are in the IT industry, with nearly another quarter being in creative industries, such as writing, editing, art and photography. Freelancers on elance.com earned over \$700 million in 2013.³ Similarly, oDesk.com posted 1.5 million freelance jobs in 2013 to its 4.5 million registered freelance workers.

Another way that micro-job workers provide intermediate inputs to businesses is by creating online entertainment and broadcasting content that serves as a platform for advertisements that reach a company's targeted audience. Similar to the longstanding larger-scale newspaper and television industries, bloggers and YouTubers produce content that itself has no intrinsic pecuniary value; through intermediaries such as Google AdSense and BlogHer, popular blogs and YouTube stations host advertisements. While many of these blogs begin as hobbies rather than money-making enterprises, once they become popular, they can range from making ten dollars a month to thousands of dollars. Those who work full-time on their blogs may be likely to report their hours on a typical survey, but those who spend a few hours a week updating their blogs, making a few extra dollars from ads may be less likely to report the time spent on this money-making hobby.

³ Note that these numbers reflect global freelancers. However, the United States is the top country for freelancers.

- **Data collection needs**

This paper has only been able to present anecdotal evidence on the size of the new informal micro-job market. A select few intermediary companies report overall statistics on the number of transactions or the dollar earnings of its users. In most cases, it's impossible to determine whether these users are in the United States or elsewhere. Additionally, we cannot begin to estimate the number of man-hours that were required to produce these goods and services. As such, we do not know whether the magnitude of the informal labor market is sufficient to significantly bias employment or productivity statistics.

There are two possible ways to collect the data we need. The first is by a population survey of potential informal workers, possibly in conjunction with a time-use survey. We can directly ask people whether they have conducted or regularly conduct any such informal transactions, how many hours they worked to complete the transaction, what they were paid, and perhaps even whether they would have included such hours in a survey on "hours worked at all jobs last week". The benefit to using a population survey is that in addition to obtaining information on the hours worked at such jobs, it would be possible to determine the number of such jobs people hold, as well as the demographics of who holds these jobs. The drawback to collecting the data in this manner is that the same motivations for performing the work through informal channels may make the worker reluctant to report on the work in a survey. By law, any work that nets \$600 or more per year from a single "employer" must be reported to the IRS; however, it is quite likely that much of it does not in fact get reported. Informal workers may fear that reporting the amount of informal work they do will draw attention to it by policy-makers.

The second way to collect the data would be to survey (or sample experimentally, as by Ipeirotis, 2012) the largest of intermediaries and hosts of informal transactions. This too may be difficult to collect—although the companies may not have any specific incentive to withhold the information, the types of records they maintain may vary quite a bit, and are not by nature what might be useful for this study. On the other hand, not having any disincentive to report their use of informal micro-workers or crowd-sourcing, online business intermediaries may be more likely to report accurate estimates of the number of hours. While there is no perfect data source, it seems clear that some form of data collection can help us determine the magnitude of the informal micro-jobs sector, who are the micro-workers, and why they choose these jobs.

- Conclusion

Advances in technology, and a reduction in the cost of new technologies have opened the door to a new informal sector, that of micro-jobs and crowd-sourcing. Coming about in a time of high unemployment and low wage growth in the United States, this type of employment seems to be becoming more common, unlike traditional informal sector employment, which has not been predominant in developed countries.

The size of informal sector job markets has always been difficult to measure, and this new form of informal market is no different. Presently we have only anecdotal numbers about the number of micro-job workers there are in the United States, how many hours they work, what their demographic characteristics are, and what their earnings and output are. If the informal sector is significant, failing to measure it may bias our estimates of employment, output and productivity of the US economy.

This paper, more than anything is a plea for data collection. Either through a population survey or time-use questionnaire, or through a survey of online intermediaries, such as eBay, eLance, iStockphoto, and Blogger, it is important that we attempt to measure the size and features of this informal micro-job market. Doing so will enable us to adjust measures of economic activity if necessary, and will allow policy-makers to determine whether they need to consider any intervention to either encourage or discourage this sector.

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