

**A Labor Market Issue<sup>1</sup>**  
**In-Class Problem<sup>2</sup>**

You've been appointed the Secretary of Labor for the nation of Tangria by a newly elected President who has little understanding of the labor market. Tangria is a small nation with questionable economic integrity, and has a population of 11,250,000 - 4,375,000 of whom are ages 16-65. Some of the President's closest advisors have explained that unemployment is non-existent, that there's no more than one worker per household, and household incomes average \$89,000; So there's little need to focus precious political resources on creating jobs or improving incomes. You're not so sure the picture is as positive as others close to the President make it appear.

The former Labor Secretary, may he rest in peace (just disappeared in the middle of the night ... oh well) , identified that the current formal labor market is parameterized by labor supply and demand relations of  $L_S = 200,000 + 200W$  and  $L_D = 2,000,000 - 280W$ , where  $W$  is equal to the median and mean monthly household wage income and  $L$  is equal to the number of employed workers in the formal labor market. This tells you important information about the wages earned in this market but does not tell you about other incomes such as interest earnings, investment proceeds, rents, royalties, etc..

Tangria's Treasury Secretary, very close to the President, has given you some information about Tangria's formal economy: GDP is \$120 billion (including all wages, interest earnings, investment proceeds, rents, royalties), the average household total income is \$89,000, GDP per worker is \$126,316, and the formal labor force is 950,000 workers.

You're concerned that these figures all relate to the formal economy, but you've observed a large informal economy. Your close ally, the Secretary of Health, Education and Welfare has a different story to tell than her peers on the Cabinet and is not very popular with the President or much of the Cabinet. She lets you know that there are 3,850,000 people working in the informal sector with total output of \$6,545,000,000 and confirms that this figure is not picked up in the GDP report.

You know you need to represent figures to the President and Cabinet inclusive of the nation's economy and must aggregate the formal and informal sectors. You've been requested to attend the first cabinet meeting and set out your agenda. All you have to go on is the following data and your amazing labor economic skills. Good luck, and try not to suffer the fate of the former Labor Secretary.

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<sup>1</sup> This primer is intended to present an abbreviated discussion of the included economic concepts and is not intended to be a full or complete representation of them or the underlying economic foundations from which they are built.

<sup>2</sup> This problem set was developed by Richard Haskell, PhD (rick.haskell@utah.edu), Department of Economics, College of Social and Behavioral Sciences, The University of Utah, Salt Lake City, Utah (2015).

**1. What is the average output per informal worker?**

$$\text{Informal Output Per Worker} = \frac{\text{Informal Output}}{\text{Informal Workers}} = \frac{6,545,000,000}{3,850,000} = \$1,700$$

**2. What is the actual aggregate output per worker (formal and informal) for all earnings in the economy (includes wages, interest earnings, investment proceeds, rents, royalties, etc.)?**

$$\begin{aligned} \text{Aggregate Output Per Worker} &= \frac{\text{GDP (formal output)} + \text{Informal Output}}{\text{Formal Workers} + \text{Informal Workers}} \\ &= \frac{120,000,000,000 + 6,545,000,000}{950,000 + 3,850,000,000} = \$26,363.54 \end{aligned}$$

**3. What is the median annual income per formal worker (household)?**

$L_s = L_d$  (given the information provided)

$$200W + 200,000 = 2,000,000 - 280W$$

$$480W = 1,800,000$$

$$W^* = \frac{1,800,000}{480} = \$3,750$$

To find  $L^*$  simply substitute the value of  $W^*$  into either the supply or demand equation for  $W$  and solve for  $L^*$ . I've used the labor supply equation, but you'll get the same answer with either equation. Why? Because  $L_s$  and  $L_d$  are equal at a wage of  $W^*$ .

$$L^* = 200(3,750) + 200,000 = 950,000$$

$$\text{Median annual income per worker (household)} = \$3,750 \times 12 = \$45,000$$

**4. What is the average annual aggregate earned income per worker? Recall that earned income includes wages, and informal labor market earnings.**

*Average Aggregate Annual Earned Income Per Worker =*

$$\begin{aligned} &= \frac{(\text{Wage income per worker} \times \text{formal workers}) + (\text{informal labor market output})}{\text{Formal Workers} + \text{Informal Workers}} \\ &= \frac{(45,000 \times 950,000) + 6,545,000,000}{950,000 + 3,850,000,000} = \$10,270 \end{aligned}$$

## 5. What is the LFPR for this entire economy?

$$\begin{aligned} LFPR &= \frac{\text{Informal Workers} + \text{Formal Workers}}{\text{Population 16-65}} (100) = \frac{3,850,000 + 950,000}{4,375,000} (100) \\ &= \frac{4,800,000}{4,375,000} (100) = 109.71\% \end{aligned}$$

## 6. What might you infer from this LFPR and output per worker?

Armed with the knowledge that there is certainly some level of unemployment in every market, at least some frictional unemployment, this suggests that not all adults ages 16-65 are productively engaged in creating income. We're also told that these are largely single income households, so we can presume that many adults aren't involved in the formal market economy.

Since we have no figures letting us know how many of the informal workers are "at work" on any given day, it's difficult to access employment or unemployment rates for this market of workers. What we know is that they are at least "under-employed". We also know that they own their means of production, so that means that there's no sharing of profit with shareholders/investors.

We're left to ponder over the assertion that there is only one income per household, which may not be true when we add in the informal labor market. So there's not much we can do or say about this.

With a LFPR of greater than 100% and presuming some level of frictional unemployment, we're left to conclude that there are people working well beyond age 65 and younger than age 16. This is not at all unusual for an informal labor market.

## 7. What might you infer from this output per worker?

With figures of \$45,000 average wage income per formal market worker, \$1,700 income per informal market worker, GDP of \$126,316 per formal market worker, GDP per capita of \$10,667, Aggregate Output Per Worker of \$26,364 and average annual aggregate earned income per worker of \$10,270, we're certainly looking at some significant level of income inequality, but we've also got a quandary, how can the GDP per capita be less than the average aggregate income per worker. The answer lies in the informal market figures not being reflected in GDP.