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SOLUTIONS TO MIDTERM EXAMINATION 2014

1. Do you agree, partly agree or disagree with the following statements? If you partly agree, be explicit about which part you agree with, and which you disagree with. Provide detailed reasoning and/or data sources for your answer.

(a) *The Solow model of growth predicts that poor countries need to achieve higher savings rates than rich countries in order for the gap in per capita incomes between them to narrow over time.*

False. The Solow model predicts the gap between poor and rich countries's p.c.i. would narrow if they all achieved the same rates of savings, population growth and technical progress.

(b) *Cross-country regressions show that per capita income in 1995 was negatively correlated with urbanization rates in 1500 and positively correlated with urbanization rates in 1995.*

True, as shown by Acemoglu, Johnson and Robinson.

(c) *Countries with GDP per capita (PPP adjusted) above $4000 per annum invariably have poverty head count ratios below 10%.*

True, in World Bank's data on poverty.

(d) *Cross-country studies and longitudinal (country panel) studies show conflicting patterns with respect to how poverty rates vary with per capita income.*

False: both cross-country and longitudinal studies show poverty rates decline with per capita income.

1

(e) *The Lewis model of development predicts that policies such as progressive taxes which redistribute income from capitalists to workers would slow down the rate of growth of per capita income.*

True: growth in the Lewis model is driven by investment by capitalists. Redistributive taxes would reduce capitalist profits, and thus also the investment rate.

(f) *Fertility rates in developing countries are strongly negatively correlated with average years of schooling of adults and per capita income.*

Partially true. Fertility rates are negatively correlated with years of schooling of women, but not with respect to years of schooling for men. Controlling for education and urbanization rates, fertility rates rise strongly with per capita income. This is shown in cross-country regressions of Paul Schultz.

2. *Consider the following version of the Harris-Todaro model. The total size of labor force of the economy is 100. The demand for labor in the formal sector in urban areas is $200 - w_I$, where w_I denotes the wage in this sector. The rural wage w_R and the marginal product of labor in agriculture both equal 120, irrespective of employment levels. Workers either locate in the rural area, or costlessly migrate to the urban area and search for a job there. If they do not manage to get a job in the formal sector, they remain unemployed in the urban sector. The prices of the agricutural and industrial goods are fixed at unity.*

(a) *Consider first the case where there is no minimum wage regulation in the urban sector, and adjusts to clear the urban labor market. What will the equilibrium value of the urban wage w_I be? Calculate the number of workers in the urban formal sector (L_I), those that are unemployed in the urban sector (L_U) and those that stay in the rural sector. What is GDP?*

$w_I = 120; L_I = 200 - 120 = 80; L_U = 0; L_A = 20$ since wages in the urban sector must equal that in the rural areas with flexible wage adjustment.

Profits in the urban sector are $80 * 80 * \frac{1}{2} = 3200$; wages are $100 * 120 = 12000$, hence GDP equals $3200 + 12000 = 15200$.

(b) *Now suppose the government imposes a minimum wage of $180 in the urban formal sector. How does this change your answer to (a)?*

Now $w_I = 180$ and there will be excess supply of workers in the urban sector. In equilibrium workers must be indifferent between remaining in the rural area and earning 120, or migrating to the urban sector and earning an expected wage of $(1 - u) * 180$, where u is the urban unemployment rate. Hence $120 = (1 - u) * 180$, implying $u = \frac{1}{3}$. Now $200 - 180 = 20 = L_I$. Hence $u \equiv \frac{L_U}{L_U + L_I} = \frac{L_U}{L_U + 20}$, and therefore $L_U = 10$. The effect is to reduce urban as well as rural employment, while creating urban unemployment.

This implies $L_A = 100 - 10 - 20 = 70$. Profit in the urban sector now is $20 * (200 - 180) * \frac{1}{2} = 200$, wages in the urban sector are $20 * 180 = 3600$, and wages in agriculture are $70 * 120 = 8400$. Hence GDP is 12200, lower than in (a). This is because of the misallocation of labor between urban and rural sectors.

(c) *Starting with the situation in (b), suppose there are some new industrial investments which increases the demand for labor in the urban formal sector by 20%, so the demand for labor now becomes $240 - 1.2 * w_I$. What is the effect on wages, employment and unemployment in the two sectors, and on GDP?*

Now $L_I = 240 - (1.2) * (180) = 24$. u continues to be $\frac{1}{3}$, so $L_U = 12$, implying $L_A = 100 - 24 - 12 = 64$. Urban unemployment rises from 10 to 12, while the urban unemployment *rate* remains the same. There are no effects on wages. The effect is to increase migration out of rural areas by 6, 4 of whom get jobs in the urban sector and the other two become unemployment.

Profit equals $24 * (200 - 180) * \frac{1}{2} = 240$, urban wages are $24 * 180 = 4320$, and rural wages are $64 * 120 = 7680$. Hence GDP equals 12240, higher than in (b), but lower than in (a).

(d) *What lessons would you draw from this concerning government policy?*

(a) Minimum wage regulations can induce workers to be unemployed, and cause labor to be misallocated between sectors resulting in a decline in GDP. While a few workers

experience large wage gains, the rest of the economy (such as capitalists and workers who become unemployed) become worse off. The effect on inequality is ambiguous. Hence the effect of minimum wage regulations is complex, and decisions concerning such regulations should depend on the precise objectives of policy-makers.

(b) Raising levels of industrial investments can help raise GDP, but also cause serve total number of unemployed to increase further, while reducing agricultural production. These side-effects arise due to the misallocation of labor between the rural and urban sectors, which is aggravated by the increase in investments.