1 Problem 1
Kleptocracy is when the highest level of government is corrupt and acts in a way to enrich the elite at the expense of the general public.

2 Problem 2
Cost disease is the shifting of expenditures into areas where there is low productivity growth. High productivity in one sector may allow resources to be shifted away to a less productive sector. For example the increase in the significance of the service sector in the US.

3 Problem 3
Reduction in labor market discrimination would increase allocative efficiency. In the past a minority might take a job because it was a job they were allowed to do, instead of because it was the most productive use of their labor. The removal of these frictions would allow everyone to sort into the jobs at which they are most suited and thus increase the efficiency of production.

*If you find an error or typo please send an e-mail to david.glancy@brown.edu. Thank you.*
4  Problem 4

Part of the inequality in the US comes through education. Wealthier families can take actions that will increase the probability of getting accepted to a good school, without having any effect on actual productivity once they hit the labor market. These students can apply to more schools, take the SAT more times, etc. Other actions like hiring tutors might increase labor force productivity directly, but increase wages mostly by enabling the student to get into a good school. If this channel is shut down because admissions are random, then inequality will decline once the students enter the labor market. The education they receive will enable them to earn more relative to the wealthy, who already benefit from other factors impacting wages.

5  Problem 5

Income is skewed by a fraction of individuals holding very high incomes. Consequently, the mean income is greater than the median. Thus the mean household income is most likely to be the 60th percentile of income, since the other answers of 40 and 50 would suggest that income was symmetrically distributed or skewed to the left.

6  Problem 6

The index of ethnic fractionalization is

\[ IEF = 1 - \sum_{i=1}^{I} n_i^2 = 1 - \left( \left( \frac{2}{3} \right)^2 + \left( \frac{1}{3} \right)^2 \right) = 1 - \frac{5}{9} = \frac{4}{9} \]

7  Problem 7

7.1  a

The positive relationship between distance to the equator and GDP per capita might be because the disease environment in worse near the equator. These diseases make people less productive and less willing to invest in human capital, thus causing poverty. As most research in health is focused on serving residents of wealthier countries, those near the equator may continue
to be plagued by these diseases and fail to converge to levels comparable to those with better disease environments.

7.2 b

It is impossible to work as hard at the equator as in cooler places because of over-heating. However, declines in the cost of cooling technology will increasingly allow people in developing countries to work at similar intensities as elsewhere.

8 Problem 8

8.1 a

Higher productivity in one sector increases production and thus may cause the price in that sector to fall, preventing the marginal revenue productivity from labor from increasing although productivity rises. Alternatively, even if the price elasticity of demand is low, the increase in productivity would induce the migration of labor into the more productive sector, reducing capital per worker and offsetting the productivity increase’s effect on wage. If there is free mobility between being a barber and farmer, in equilibrium wages need to be equal regardless of technology.

8.2 b

The elasticities affect the number of barbers and farmers. If the price elasticity of demand is low in farming, there will be an increase in farmers because productivity is higher and demand doesn’t fall much as the price declines. If this elasticity is low, then the increase in technology means fewer farmers can meet the demand for food and farmers will end up moving to producing haircuts, where the increase in supply would have less of an impact on price.
9 Problem 9

9.1 a

The optimal stock is the stock which maximizes the growth rate and thus maximizes the sustainable harvest size. \( s_t(100 - s_t) \) is maximized at \( s_t = 50 \). Note that if \( s_t \) maximizes \( s_t(100 - s_t) \), it also maximizes \( \frac{s_t(100-s_t)}{100} \) and \( \frac{s_t(100-s_t)}{200} \).

9.2 b

The maximum sustainable yield is the maximum growth rate, as it means the rate at which fish are taken out is exactly equal to the rate at which they replace themselves. Since the optimal stock is 50, \( s_t(100 - s_t) = 50^2 = 2500 \). Thus the maximum sustainable yield is 25 for catfish and 12.5 for tilapia.

10 Problem 10

The environmental Kuznets curve is the amount of pollution as a function of income. For indoor pollution, we would expect it to be mostly downward sloping. If everyone is wealthy enough to have fire for the purpose of cooking or lighting and an enclosed space in which to live, then the poor would have large amounts of indoor pollution, then the amount would decline as in richer countries living spaces would start to get larger and there would be a substitution to other food or lighting sources.

For outdoor pollution, we would expect the curve to be non-monotonic. It would start low, where people can’t afford cars and industrial production is minimal, then pollution would get worse as production and consumption rise in the process of development and then fall in high income countries where there is a willingness to pay to avoid pollution (the lack of pollution can be seen as a luxury good.)
11  Problem 11

11.1  a
The leading country produces depending on its investment in research divided by the cost of innovating, a change in the cost of copying is irrelevant. It will grow at the same rate in the short and long run.

11.2  b
In the short run, the country will grow faster when the cost of copying declines. Then the country will go to a new equilibrium where it is closer in technology to 1, and growing at the same rate as before. The decline in backwardness exactly offsets the lower copying cost so that long run growth is unchanged.

12  Problem 12

The dictator will weigh the benefits of the public good versus the cost of the tax. If labor is supplied inelastically, the public good will be provided in a larger amount because the wage tax won’t create a decline in labor supply. If people work less when they are taxed more, increasing the amount of public goods will decrease consumption by more than with an inelastic supply.

13  Problem 13

Before the unified tax regimes, countries would want to tax labor relative to capital, because capital is more likely to respond to the high tax rates and flow out of the country. If the tax rates are uniform, the level of the taxes won’t impact the location of production, so it becomes less costly to tax capital. Since wealthier people have a higher percentage of their wealth in the form of capital instead of labor, this increase in the tax on capital relative to labor would compress the income distribution.