Labour Economics
Supervision 2

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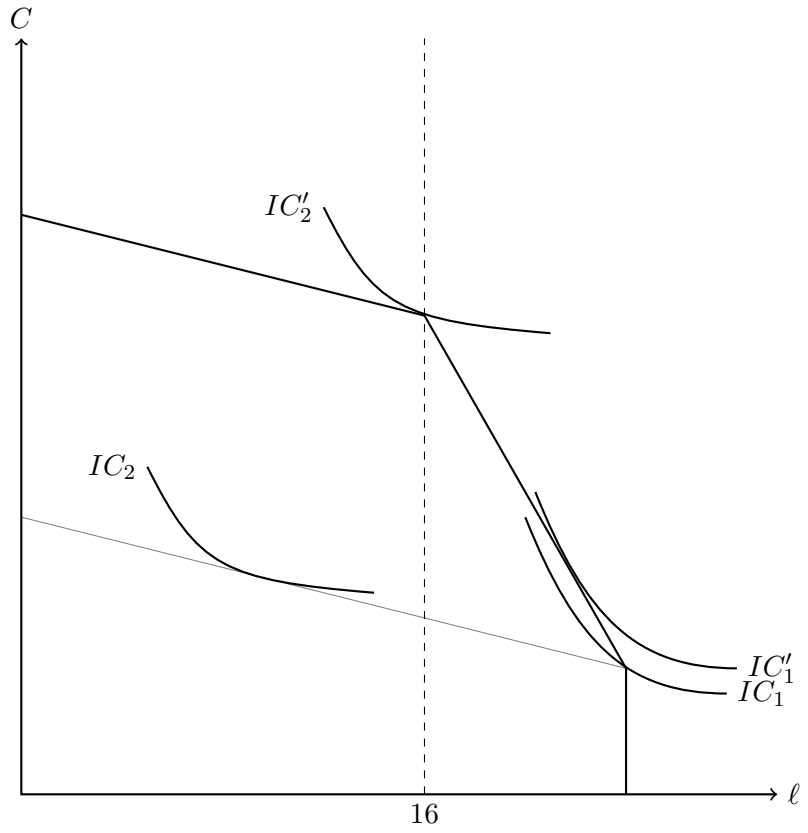
Question 1

We assume that childcare costs be t per hour, and that the parent only has to pay for childcare during their working hours. Letting non-labour income be N and leisure in hours be ℓ, and normalizing prices to 1, the budget constraint is $C = w(24-\ell) - t(24-\ell) + N = (w-t)(24-\ell) + N$ (assuming all production and consumption decisions are made on a day-to-day basis). In this case the budget constraint in (ℓ, C) space is just one with a vertical line at $\ell = 24$ up to N, and slopes upward to the left with a gradient of $(w-t)$.

With a subsidy that pays \$3 per hour up to 8 hours each day, the new budget constraint is

$$C = \begin{cases} (w-t+3)(24-\ell) + N & \text{if } \ell \geq 16 \\ (w-t)(24-\ell) + 24 + N & \text{if } \ell < 16 \end{cases}$$

and this can be represented graphically as such:



The possible effects on labour force participation are illustrated by IC_1. On the extensive margin, this will unambiguously increase the labour force participation as the effective wage faced by those out of the labour market increases. Only those with a reservation wage higher than $(w-t+3)$ will remain out of the labour force, whereas before the policy anyone with a reservation wage higher than $(w-t)$ would choose not to work.

On the intensive margin, there are ambiguous effects. If the ex-ante optimal choice was on the right of the dashed line, that is, to work less than 8 hours, the policy will raise the worker's effective wage. In terms of leisure, there is a negative substitution effect but a positive income effect, so the total change in hours worked is ambiguous. The higher ℓ is in the ex-ante choice, the more likely it is that the new policy leads to an increase in hours worked. The Slutsky equation shows this:

$$\begin{aligned}
\ell_c(w,m) &= \ell(w, e(\bar{U})) \\
\frac{\partial \ell_c}{\partial w} &= \frac{\partial \ell}{\partial w} + \frac{\partial \ell}{\partial m} \cdot \frac{\partial e}{\partial w} \\
&= \frac{\partial \ell}{\partial w} + \frac{\partial \ell}{\partial m} \ell^* \\
\frac{\partial \ell}{\partial w} &= \frac{\partial \ell_c}{\partial w} - \frac{\partial \ell}{\partial m} \ell^*
\end{aligned}$$

where ℓ_c is the compensated demand function for leisure, m is total income, $e(\cdot)$ is the expenditure function for some utility level and $\bar{U}$ is the utility obtained with m income. With a higher ℓ^*, the total change in leisure is more likely to be negative, as in the shift from IC_1 to IC_1' (although in this case ℓ cannot go any higher).

If the ex-ante optimal choice was on the left of the dashed line, that is, to work more than 8 hours, then there will be an unambiguous decrease in hours worked. An example of this is the shift from IC_2 to IC_2'. The new budget constraint in that region is equivalent to an increase in income, and there is only a positive income effect on leisure if it is a normal good.

How likely it is that the hours of work will increase thus depends on the underlying distribution of work hours among the people affected by the policy. If the density function for hours worked among single parents is left-skewed with a more concentrated mass on the right, it is likely the policy will reduce the total number of hours worked, and vice versa. As it stands, the OECD figures on this seem to suggest that the highest proportions of single parents take on part-time work and less than 29 hours of work per week in the UK, whereas in the US full-time work is most common and a majority work 40 to 44 hours a week. (*LMF2.3: Patterns of employment and the distribution of working hours for single parents.*)

If single parents are on the lower end of the income scale, then the policy is likely to reduce the earnings inequality among workers for countries where single parents tend to work a lot less. In such countries (such as in the UK as mentioned), the policy will probably lead to an increase in total number of hours worked among single parents which will raise their aggregate earnings. Otherwise, if the policy leads to a decrease in hours worked, there might be some increase in earnings inequality since the subsidies cannot be counted as part of their earnings. However, this may not be a useful guide as to whether the policy is advisable since it doesn't reflect inequalities in welfare, which is probably reduced with the policy. Furthermore, the assumption of a given wage rate obscures an important point: with children to take care of, single parents are likely to value flexibilty over pay. When childcare is subsidised, single parents will be more able to take up higher-paying jobs even if the number of hours worked remains the same. Instead of, say, driving for Uber throughout the day for a total of 8 hours, they could take up a full-time job which pays more but requires them to work for a full 8-hour stretch. As a side note, the intergenerational effects of the policy could very well be much higher in magnitude than the first-order effects on inequality. For example, Black et

al. (2014) find that childcare subsidies have "very small and statistically insignificant effects [...] on childcare utilization and parental labor force participation", but a "significant positive effect" on children's academic performance in junior high school. If this translates to higher earnings for the children of those affected by the policy, it will further reduce inequality in earnings.

Question 2

Going off of the figures provided, childcare attendance actually decreases for the group that pays less for childcare. However, the mean difference is very small (-1.9%) and the statistical fit is poor. Furthermore, standard market assumptions are less likely to apply given that the authors note there is an excess demand for day care and there is "rationing of access to day care centers". Therefore the negative coefficient on childcare attendance would not contradict the theory even if it were economically and statistically significant; there is a price/quantity cap that has not been accounted for.

The other coefficients show a decrease in proportion of mothers in part-time work and also mothers' incomes. Whether or not the effects are economically and statistically significant, these findings will not definitively contradict theory since the theory predicts an ambiguous change in these two variables for largely the same reasons as in (a). Furthermore there is no data on whether the decrease in part-time work is because of a shift to full-time work (running concurrently with a separate decrease in full-time work) or because these mothers are dropping out of the labour force entirely.

Question 3

(a)

Plan B will likely have the least impact on employment. The contributions there are based on factors of production that are highly inelastic and behave like fixed costs in the short-run. If there are any disemployment effects, they are more likely to take hold over a longer horizon as firms cut down on investment and firm expansion. In fact, there is probably an upward bias on the employment effects as firms start to substitute labour for capital since the after-'tax' return on capital is lower. The general equilibrium effects may be subtler, but a partial equilibrium analysis where rents, wages, rental rates of capital, and prices are exogenously given could imply higher employment when firms choose the levels of land, labour, and capital that satisfies their first-order conditions.

For instance, a firm with the production function $F(T,K,L), \frac{\partial F}{\partial i} > 0, \frac{\partial^2 F}{\partial i^2} < 0, i \in \{T,K,L\}$ has the profit function

$$\pi(T,K,L) = F(T,K,L) - vT - rK - wL$$

Where T,K,L is land, capital, and labour, and v,r,w is the rental rate of land, rental rate of capital, and wage rate. Before the policy is implemented, the firms choose (T,K,L) to satisfy

$$\frac{\partial F}{\partial T} = v,\ \frac{\partial F}{\partial K} = r,\ \frac{\partial F}{\partial L} = w$$

After the policy, assuming a proportion c of $T+K$ has to be paid out as contributions, the new profit function is

$$p \cdot F(T,K,L) - (v+c)T - (r+c)K - wL$$

and now firms have to choose (T, K, L) to satisfy

$$\frac{\partial F}{\partial T} = \frac{v+c}{p},\ \frac{\partial F}{\partial K} = \frac{r+c}{p},\ \frac{\partial F}{\partial L} = \frac{w}{p}$$

If we assume $\dfrac{\partial^2 F}{\partial ij} > 0$ where $j \neq i$, two things will happen in the longer term: the proportion of labour to land and capital will increase, raising the ratios of $\frac{MPT}{MPL}$ and $\frac{MPK}{MPL}$ to $\frac{v+c}{w}$ and $\frac{r+c}{w}$. However, aggregate production may also decrease in order to equate the marginal products of the inputs to their product costs, and so the effects on employment are ambiguous. Still, the disemployment effects (if there are any) will be less severe than if the cutback in production had no bias against capital and land at all. The tradeoff is that with a bias against capital deepening, wages are likely to fall in the longer term.

(b)

For Plan A, the conditions that would lead to the largest reduction in employment include:

- Short-term labour contracts (hourly in the extreme case)
- Low search costs or a slack labour market
- Little on-the-job training required (low costs of rehiring)
- Very high unit labour costs (especially if contributions are a flat rate per hour worked)
- High elasticity of substitution between labour and capital

For Plan B, these conditions include:

- High fixed costs, low per-unit profits, and perfect competition (firms don't have supernormal profits to absorb the cost increase, and leave the market). But it may be rare for an industry with high fixed costs to be close to perfect competition
- Low elasticity of substitution between labour and capital
- High labour-land ratio
- Quantities of inputs are highly variable in the short run

and for Plan C, these conditions include:

- Low profit per unit of output
- High output share of labour
- High elasticity of substitution between labour and capital
- Short lead times and high storage costs