What if the Firm Cannot Pay Negative Wages? (Dixit-Nalebuff, p. 305)

If the worker has no wealth, he and the firm can't use the contract $(F = -10, S = 90)$. The contract must also satisfy the constraints, $F \geq 0$ and $S \geq 0$.

The effort-choice constraint is still $.8S + 2F \geq .6S + 4F + 20$. We found before that this requires that $S - F \geq 100$; the difference in wages between success and failure has to be at least 100.

But now $F = 0$ is the lowest we can make the failure wage. So the cheapest contract for the employer that will satisfy the effort-choice constraint is $(F = 0, S = 100)$.

Will the employer be willing to pay this, when he could get profit of 70 by just settling for low effort? Yes. The employer's profit under this contract is

$$.8(200 - 100) + .2(0 - 0) = 80.$$

Note that the participation constraint for the programmer is more than satisfied:

$$.8S + .2F = 80 + 0 \geq 70.$$

The employer purposely pays an expected wage higher than necessary to attract the worker, in order to give him an incentive for high effort. This is known as an "efficiency wage".