Lemma 2 is the global bank analogue of Lemma 1, and the proof is in the Appendix. The one difference is that $\psi < 1 - \alpha$, so that the liabilities of the global bank are risk-free and earn the risk-free rate i. The global bank has enough own funds to absorb the credit loss α, so that its liabilities are risk-free even though its assets are risky. The fact that global banks can borrow at the risk-free rate is reminiscent of Geanakoplos (2010) and Fostel and Geanakoplos (2012), who also have the feature that borrowers' probability of default is zero, but for reasons that are different from our model. However, the common thread is that *actual* default by the bank does not happen precisely because the contract addresses the *possibility* of default by the bank by limiting leverage.

2.2.7 Closed-form solution

We can now solve the model fully. For the global bank, the good portfolio has payoff $1 - \alpha$ with certainty since defaults are independent. Since the bank has zero probability of default whenever $\psi < 1 - \alpha$, Lemma 2 implies that the global bank's probability of default is zero, so that i is the (exogenous) dollar risk-free rate. Since $\psi = (1 + i) M / (1 + f) L$ and from the balance sheet identity $E_G + M = L$, the global bank's supply of wholesale lending is

$$L_S = \frac{E_G}{1 - \frac{1+f}{1+i}\psi} \tag{28}$$

The market clearing condition for L is

$$\frac{E_R}{\frac{1+f}{1+r} \cdot \frac{1}{\varphi} - 1} = \frac{E_G}{1 - \frac{1+f}{1+i}\psi} \tag{29}$$

The funding rate f can be solved as

$$1 + f = \frac{1}{\mu \frac{1}{(1+r)\varphi} + (1 - \mu) \frac{\psi}{1+i}} \tag{30}$$

where $\mu = E_G / (E_G + E_R)$. Substituting into (17) and (28), we can solve for aggregate loan supply to entrepreneurs as a function of the regional lending rate r:

$$C_s(r) = \frac{E_G + E_R}{1 - \frac{1+r}{1+i}\varphi\psi} \tag{31}$$

The dollar lending rate r is solved by equating loan supply (31) with loan demand $C_d(r)$