Fire-Sale FDI

Yankun Wang

Department of Economics

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What is Fire-Sale FDI?

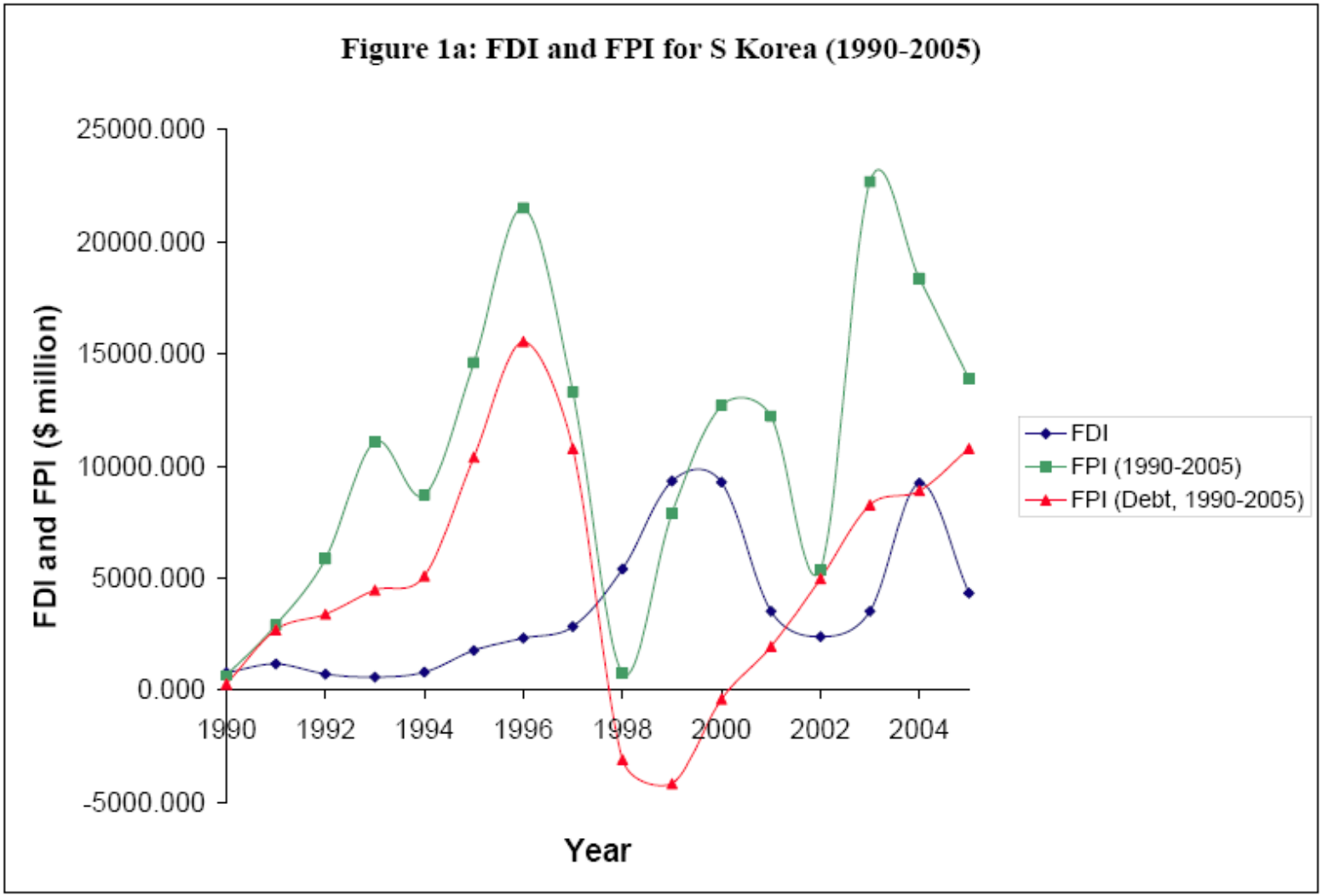
- During a liquidity crisis, there is an increase in foreign acquisition of domestic firms and a decline in the price of acquisitions during the crisis.
- A few examples (Paul Krugman, 1998):
  - P&G puchased a majority share of Ssanyojng Paper Co, a producer of sanitary napkins, diapers, and kitchen towels.
  - Hanwha Group's oil refining company sold its half of a joint venture in chemicals to the German company BASF.
  - Korean Air Lines, with a fleet of more than 100 jets, had a market capitalization at the end of 1997 of $240 million, roughly the price of two Boeing 747s.
  - "Mochael Jackson is getting into the action, negotiating to qcquire a ski resort from its owner, a bankrupt Korean underwear maker....."
- Aguiar and Gopinath (2005) used a firm-level data set to show that foreign acquisitions increased by 91% in East Asia between 1996 and 1998.

More Evidence:

Table 1: Correlation between Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI) in South East Asia during crisis (1996-2000) and non-crisis years

Country	Thailand	Philippines	Malaysia	Korea	Indonesia
1980-1995, 2001-2005					
Correl(FDI,FPI)	0.51	0.66	0.00	0.74	0.72
Correl(FDI,FPI Debt)	0.05	0.73	-0.20	0.68	0.78
1996-2000					
Correl(FDI,FPI)	-0.52	-0.61	-0.11	-0.43	0.59
Correl(FDI,FPI Debt)	-0.45	-0.75	-1.00	-0.85	0.85

More Evidence:



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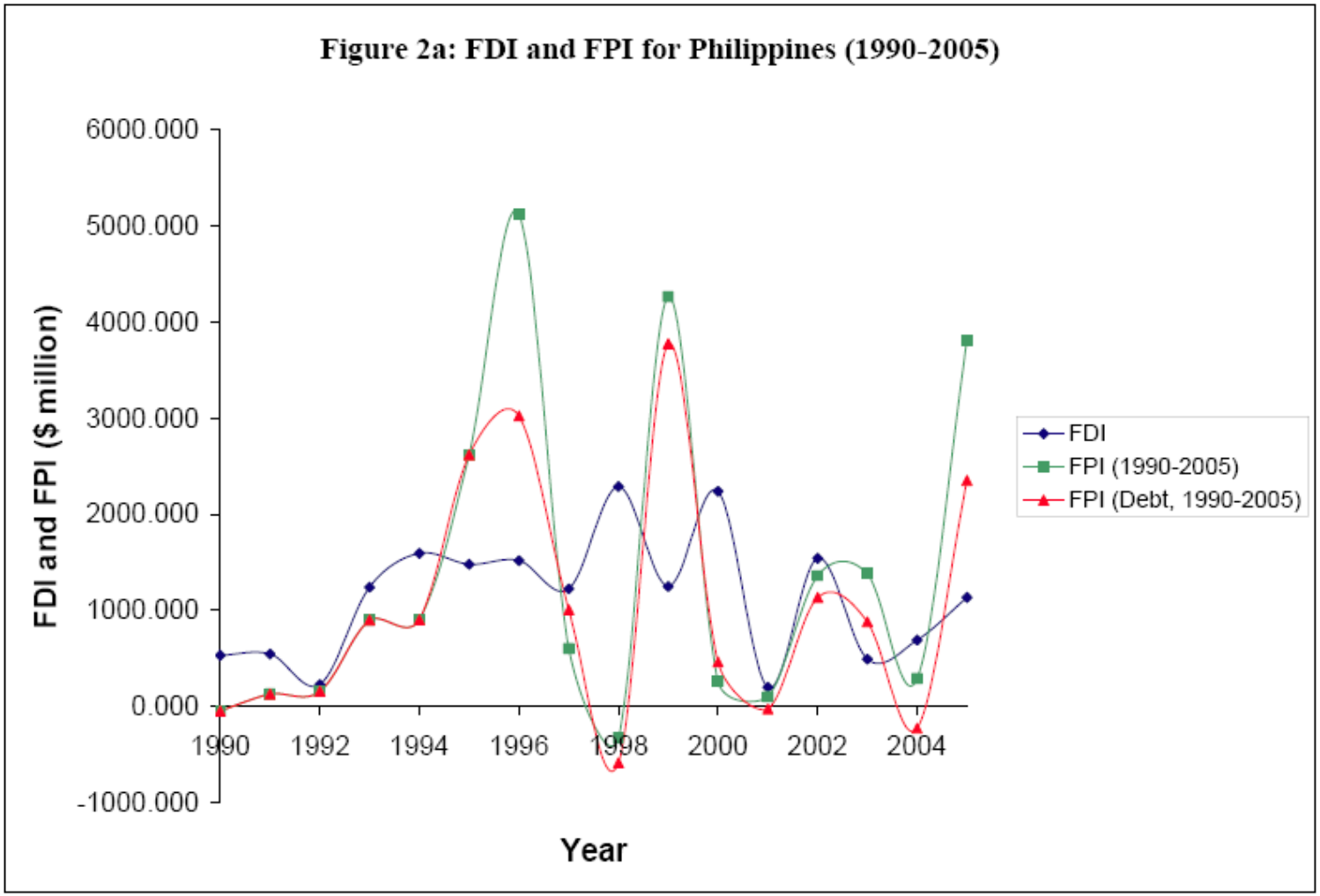


Krugman's Model I: Moral Hazard and Asset Deflation

Implicit Guarantees produced moral hazard, and hence over-borrowing and inflation of asset prices.

- The owner of an intermediary view investing in an asset as profitable in there is any state of nature in which that asset yields a return greater thatn the safe interest rate.
- Competition among internediaries eliminate any economic profits.
- The price of assets would not be based on the expected outcome, but what would happen if we lived in the best of all possible worlds.

Krugman's Model II: Disinternediation and liquidation

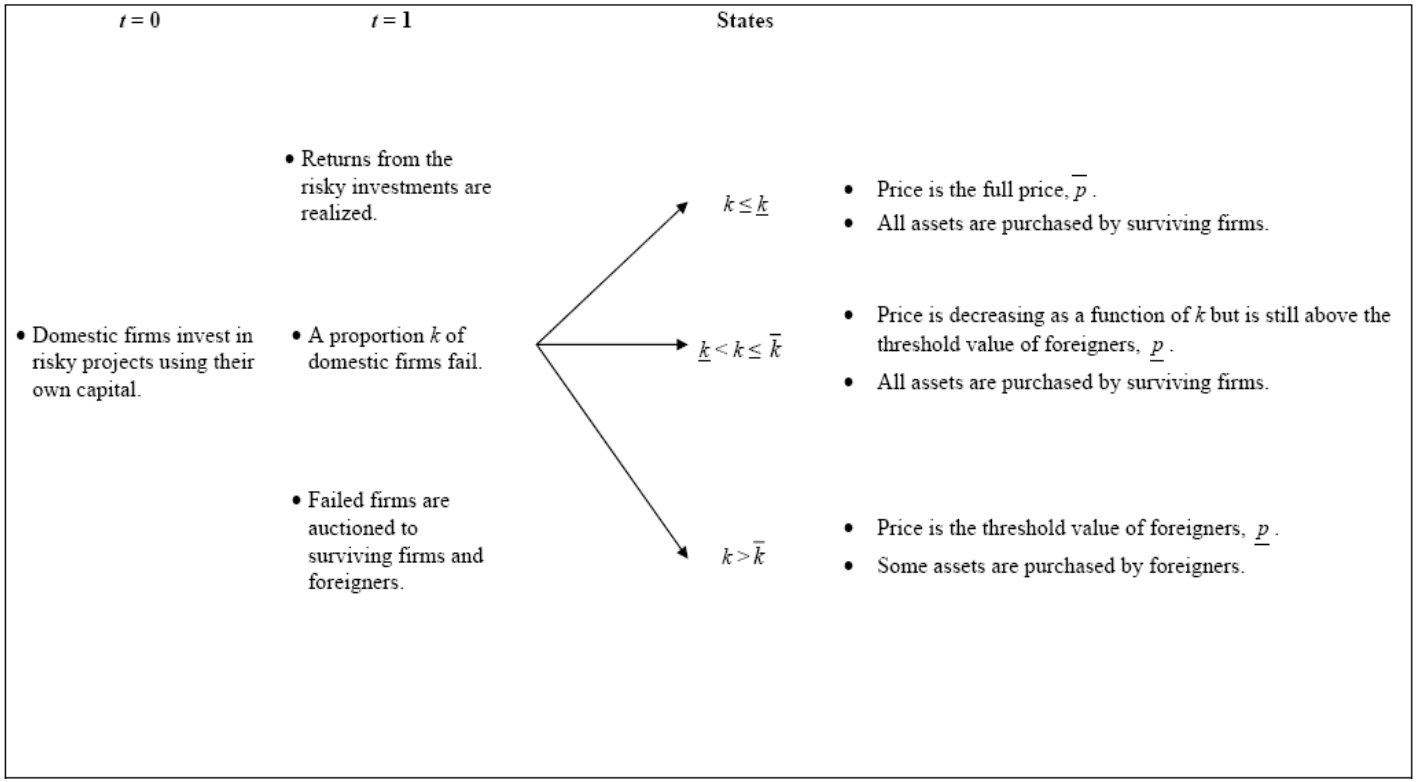
- Diamond and Dybvig (1983) points out the need for financial internadiaries, but also points out that such system is subject to run.
- During a bank run, projects have to be terminated prematurely, and resold at very low prices.

Which Explanation is more reasonable?

- Aguiar and Gopinath (2005) finds that the observed decline in liquidity can explain 25% of the increase in foreign acquisition activity in the tradable sectors.
- Acharya, Shin and Yorulmazer (2007) set up a theoretical model, in which domestic firms become external financing constrained due to agency problems in a crisis. When efficient owners, like other domestic firms face similar financing prblems, foreign ownership becomes unavoidable sectors.
- The second paper, will be our focus today.

Assumptions of the Model

Timeline of the model



Assumptions of the Model

Timeline of the model

Each firm has two consecutive investment opportunities, one at date $t = 0$ and the other at date $t = 1$. Each date t project, requires one unit of input at date t, and yields a random outcome at date $t + 1$. Provided that a firm exerts effort, the random return on its date t project is given by

$$\tilde{R}_t = \begin{cases} R_t & \text{with prob. } \alpha_t \\ 0 & \text{with prob. } (1 - \alpha_t) \end{cases}, \tag{1}$$

where $R_t > 1$ is a constant. The returns across firms are independent, so that by law of large numbers, exactly a proportion α_t of the firms have return R_t, and a proportion $(1 - \alpha_t)$ have the low return 0. We assume that the returns in the two periods are independent and leave the possibility that $\alpha_0 \neq \alpha_1$ and $R_0 \neq R_1$.[1]

Moral Hazard

There is potential for moral hazard at the individual firm level. If the firm does not exert effort, then when the return is high, it cannot generate R_t but only $\left(R_t - \overline{\Delta}\right)$ and its owners enjoy a non-pecuniary benefit of $B \in \left(0, \overline{\Delta}\right)$. For the firm owners to exert effort, appropriate incentives have to be provided by giving them a minimum share of the future profits. We denote this share as θ and get the incentive compatibility constraint as:

$$\alpha_t \theta R_t \geqslant \alpha_t \left(\theta\left(R_t - \overline{\Delta}\right) + B\right). \tag{IC}$$

Hence, firm owners need a minimum share of $\overline{\theta} = \left(B/\overline{\Delta}\right)$ to exert effort. Therefore, the firm can pledge at most a fraction $\tau = \left(1 - \overline{\theta}\right)$ of its future income if it is required to exert effort.[2]

More Assumptions

- Due to lack of expertise in domestic market, or barriers to entry into the domestic market, foreigners can not generate R_1 but only $R_1 - \triangle$, for some constant $\triangle > 0$.
- If the return from the first period if high, the firm operates one more period. If low, the firm will consider raise financing for the second period investment. This requires: $\tau\alpha_1 R_1 \geq 1$. Otherwise, it is put up for sale.
- The total resources available to a surviving domestic firm at date 1 to purchase failed firm assets is:

$$I = R_0 - 1 + \tau\alpha_1 R_1.$$

Analysis

Proposition 1 *There is a critical value of* α_1, *given as* $\alpha_1^* = \left(\frac{1}{\tau R_1}\right)$, *such that, if* $\alpha_1 \geqslant \alpha_1^*$, *a firm which had the low return from the first period investment can generate the needed funds for the second period investment. Otherwise, it is put up for sale.*

More Assumptions for the Analysis

To keep the analysis tractable we make the following assumptions:

(i) The regulator pools all failed firms' assets and auctions these assets to the surviving firms and the foreigners.

(ii) Denoting the surviving firms as $i \in [0, (1-k)]$ and the foreigners as $i = 2$, each surviving firm and foreigners submit a schedule $y_i(p)$ for the amount of assets they are willing to purchase as a function of the price p at which a unit of the asset is being auctioned, where $y_i(p) \in [0, k]$.

(iii) The regulator cannot price-discriminate in the auction.

(iv) The regulator determines the auction price p so as to maximize the expected output, subject to the natural constraint that assets allocated to surviving firms and foreigners add up at most to the proportion of failed firms, that is, $y_2(p) + \int_{i=0}^{(1-k)} y_i(p) \leq k$. Given the allocation inefficiency of selling assets to foreigners, it turns out that if the surviving firms and the foreigners pay the same price for the failed firms' assets, the regulator allocates the maximum amount she can to the surviving firms.

(v) We focus on the symmetric outcome where all surviving firms submit the same schedule, that is, $y_i(p) = y(p)$ for all $i \in [0, (1-k)]$.

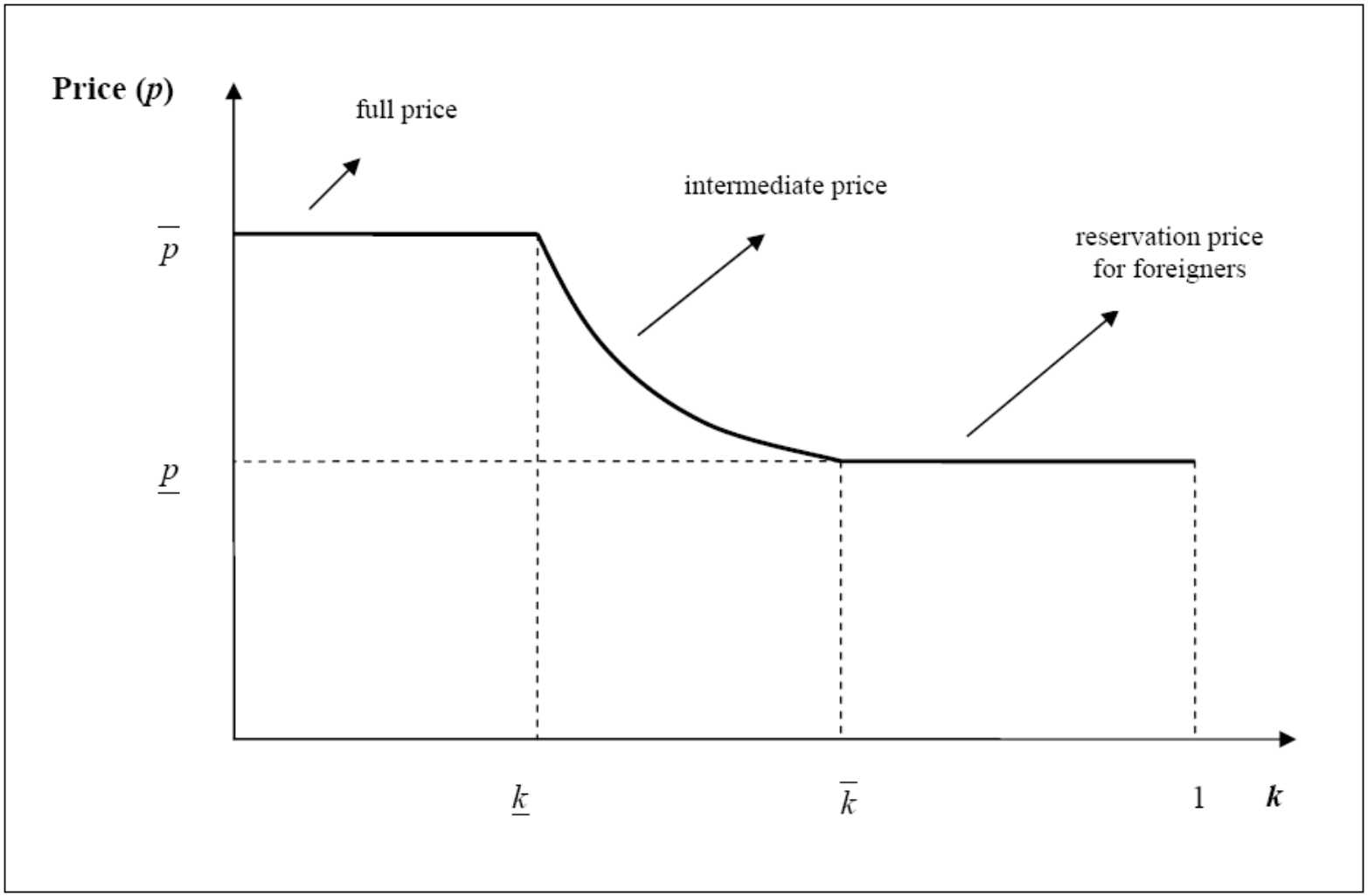
Price as a function of the proportion of failed firms

Derivation: on the blackboard

Proposition 2 *The price as a function of the proportion of failed firms is*

$$p^*(k) = \begin{cases} \overline{p} & for \quad k \leqslant \underline{k} \\ \frac{\ell}{k} - (1+\ell) & for \quad k \in (\underline{k}, \overline{k}] \\ \underline{p} & for \quad k > \overline{k} \end{cases} .$$

Price as a function of the proportion of failed firms



Adding one more critical assumption

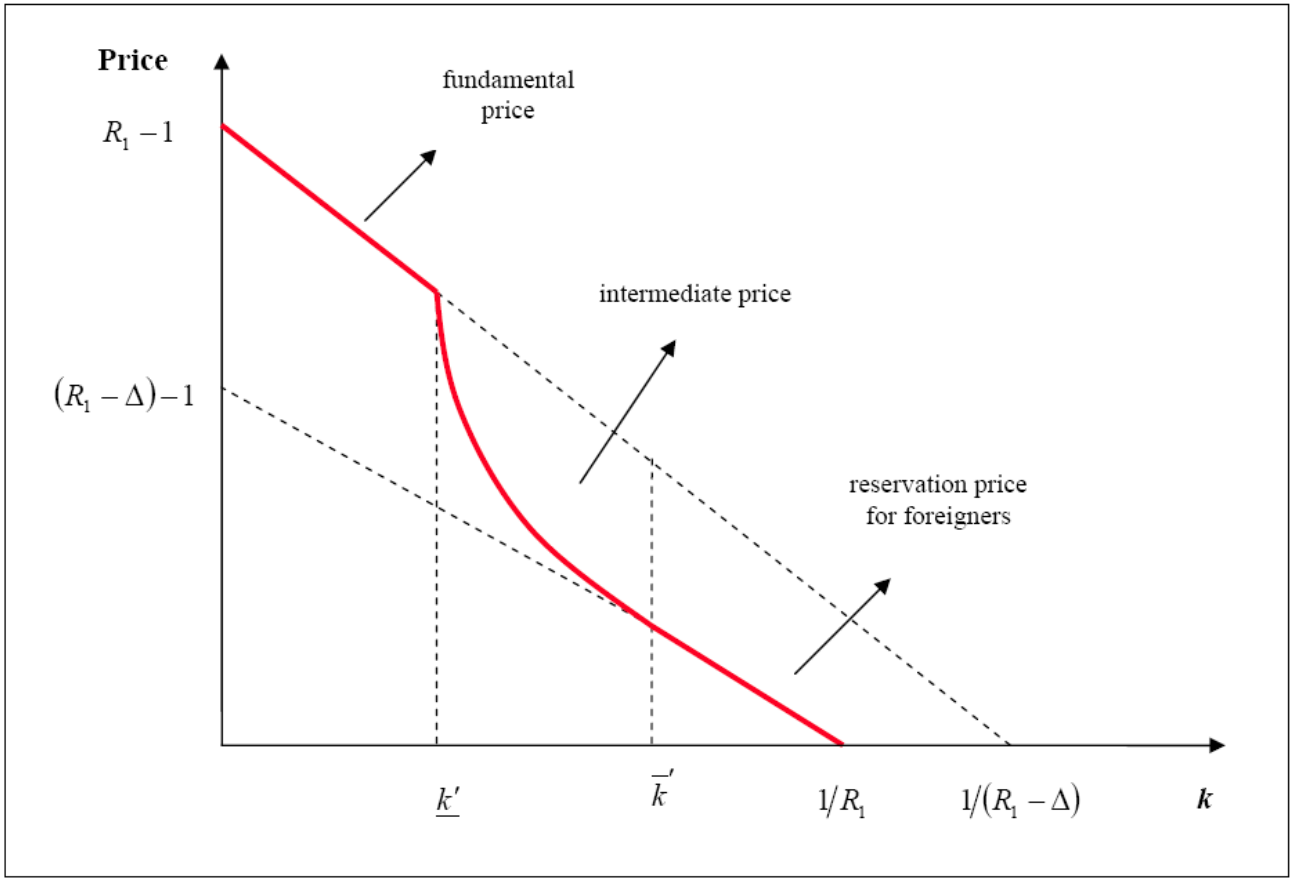
If ϕ is the parameter that represents the underlying macroeconomic factor such that an increase in it represents a better macroeconomic performance overall.
Then: k is decreasing in ϕ, α_0 is increasing in ϕ, and we assume: $k = 1 - \alpha_0$.

Corollary 1 *For $k = (1 - \alpha_0)$, the price is as follows:*

$$p^*(k) = \begin{cases} (1-k)R_1 - 1 & \text{for} \quad k \leqslant \underline{k}' \\ \frac{\ell}{k} - (1+\ell) & \text{for} \quad k \in (\underline{k}', \overline{k}'] \\ (1-k)(R_1 - \Delta) - 1 & \text{for} \quad k > \overline{k}' \end{cases}, \tag{13}$$

where $\overline{p}$ and $\underline{p}$ are given in equations in expression (10), $\underline{k}$ and $\overline{k}$ are the unique values that satisfy equations in (12), ℓ is given in equation (11), $\underline{k}' = \max\{\underline{k}, (1 - \alpha_1^*)\}$, and $\overline{k}' = \max\{\overline{k}, (1 - \alpha_1^*)\}$.

With the extra assumption, the price function looks like:]



FDI versus FPI

Proposition 3 *For $\alpha_1 < \alpha_1^*$, we have:*

(i) $BC = (1-k)(\tau\bar{q})$ *and* $\frac{\partial BC}{\partial k} < 0$.

(ii) *For* $k \geqslant \bar{k}$, *we have* $FDI = \left[k(1+\underline{p}+\ell) - \ell\right]$, *and* $\frac{\partial FDI}{\partial k} > 0$. *For* $k < \bar{k}$, *we have* $FDI = 0$.

(iii) *For* $k \geqslant \bar{k}$, *we have* $C = BC$, *and for* $k < \bar{k}$, *we have* $C = \left[k(\bar{p}+R_0) - (R_0 - 1)\right]$, *and* $\frac{\partial C}{\partial k} > 0$.

Conclusion

- In the midst of a crisis, we have both decreased portfolio investment into domestic ferms and increased FDK.
- During crisis, the supply of failed firms' assets searching for buyers surges, and results in cash-in-the-market prices.
- Thus increase in FDI.