A STUDY OF THE MUTUAL INSURANCE OF BANK DEPOSITS

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ISSUES AND GOALS

Price Deposit Guarantees

in a Joint

Consortium / Government

Insurance System

Design Regulatory Covenants

in order to

Force Banks to Reduce their Risks

Rely on Parisian Calculus

Stemming from the

Derivatives World

OUTLINE OF THE TALK

Part I :

Formulation of the Problem in the Standard Merton Framework

Part II :

Introduction of Parisian Covenants

Part III :

Design of a More Efficient Penalty System

STANDARD FRAMEWORK

Denote by :

D_T, the Deterministic Deposit Amount
($D_T = e^{rT} D_0$)

V_t, the Assets of the Bank
(Lognormal Process)

K the Amount of Deposit Shortfall
Covered by the Consortium

r the Instantaneous Risk-Free Interest Rate

In Addition to that :

Assume no Senior Debt

There Exists a Proportion θ
of Deposits w.r.t. Total Debt
(in Applications $\theta = 1$)

STANDARD FRAME ORK

Under Standard Risk-Neutral Pricing,
one Obtains Valuation Formulae
for the Guarantee Values
or Initial Premia

Government Guarantee :

$$O_G = \theta E_Q \left[e^{-rT} (D_T - V_T - K)^+ \right]$$

Consortium Guarantee :

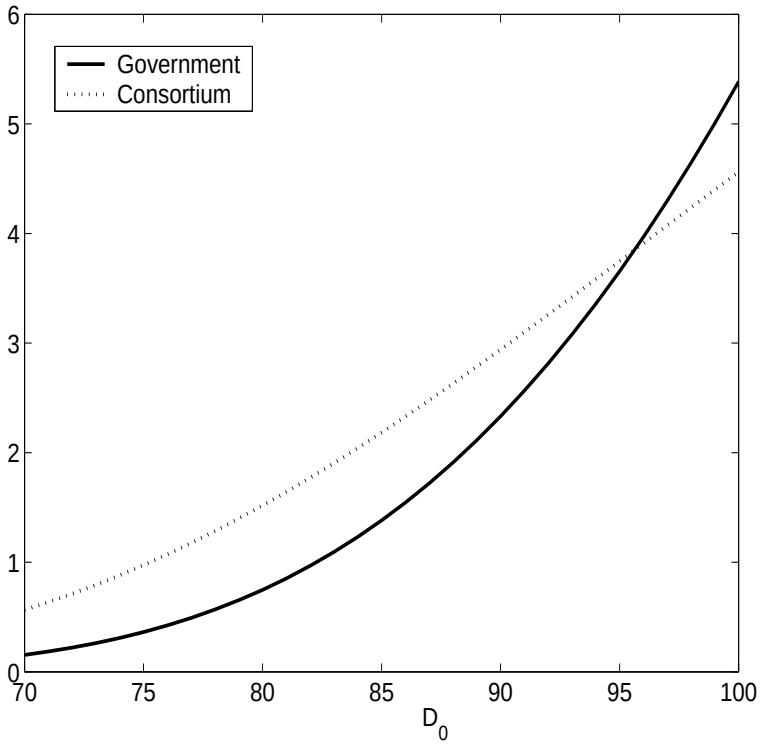
$$O_C = \theta \left(E_Q \left[e^{-rT} (D_T - V_T)^+ \right] \right.$$

$$\left. - E_Q \left[e^{-rT} (D_T - V_T - K)^+ \right] \right)$$

STANDARD FRAME ORK

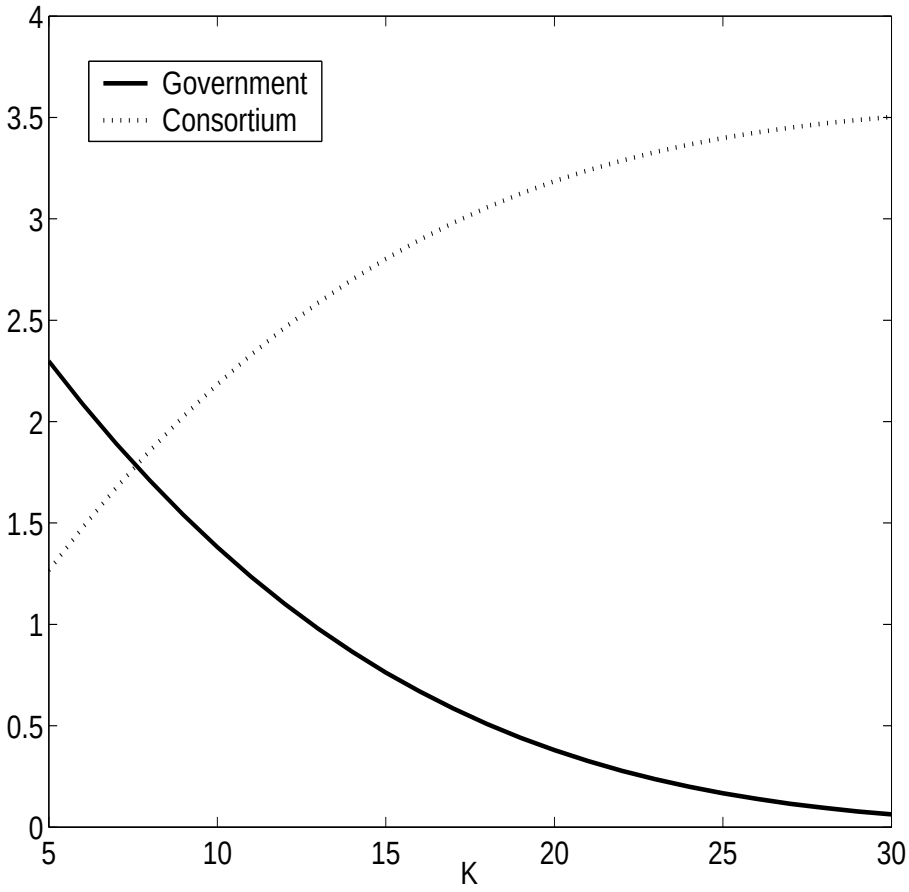
We Take :

V_0	σ	r	θ	T
100	0.25	0.03	1	1



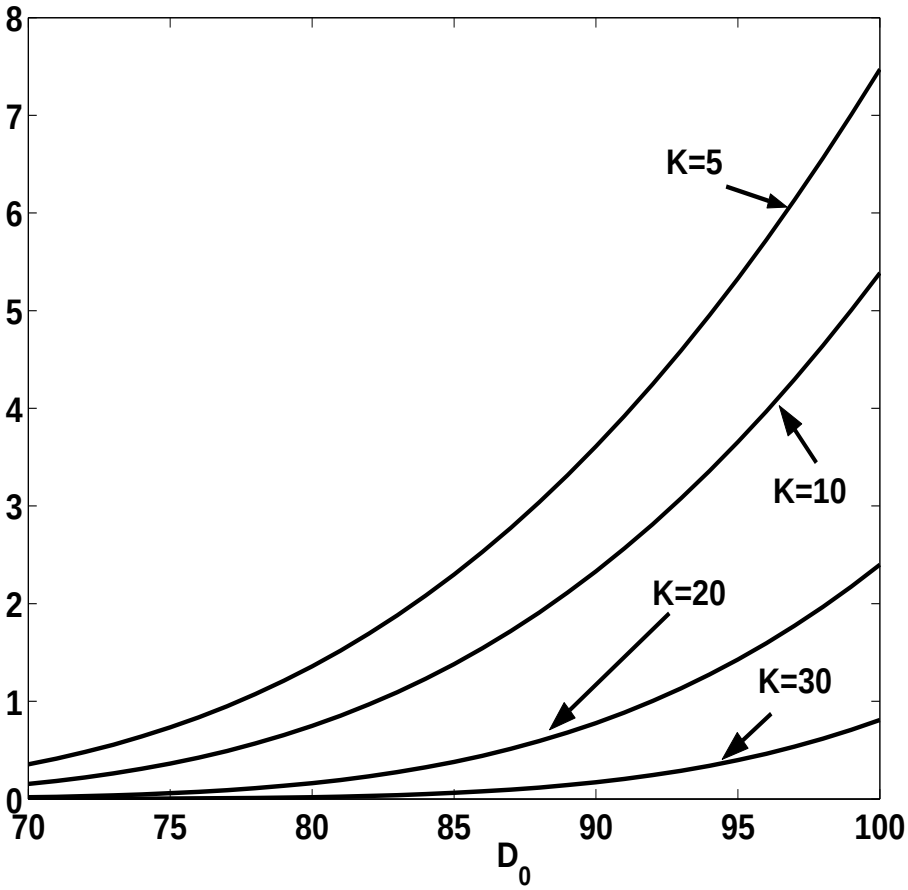
Premia w.r.t. D_0 ($K = 10$)

STANDARD FRAME ORK



Premia w.r.t. K ($D_0 = 85$)

STANDARD FRAME ORK



Government Guarantee

PARISIAN COVENANTS

Principle :

A Bank Whose Assets

Remain More than the Prespecified Time D

Below the Critical Level L

is Excluded from the Consortium.

Goal :

Incite Banks to Reduce their Risks

PARISIAN COVENANTS

Let 1^p Indicate that the Assets

did not Stay more than D

Below the Threshold L.

Consortium Guarantee :

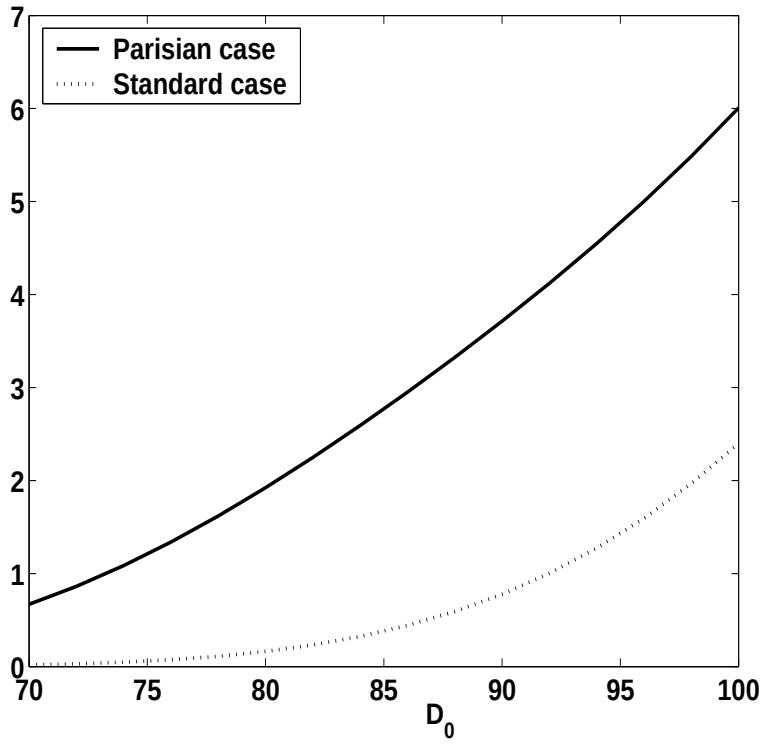
$$O_C^p = \theta e^{-rT} E_Q \left[\left[(D_T - V_T)^+ \right. \right.$$

$$\left. \left. -(D_T - V_T - K)^+ \right] 1^p \right]$$

Government Guarantee :

$$O_G^p = O_G + (O_C - O_C^p)$$

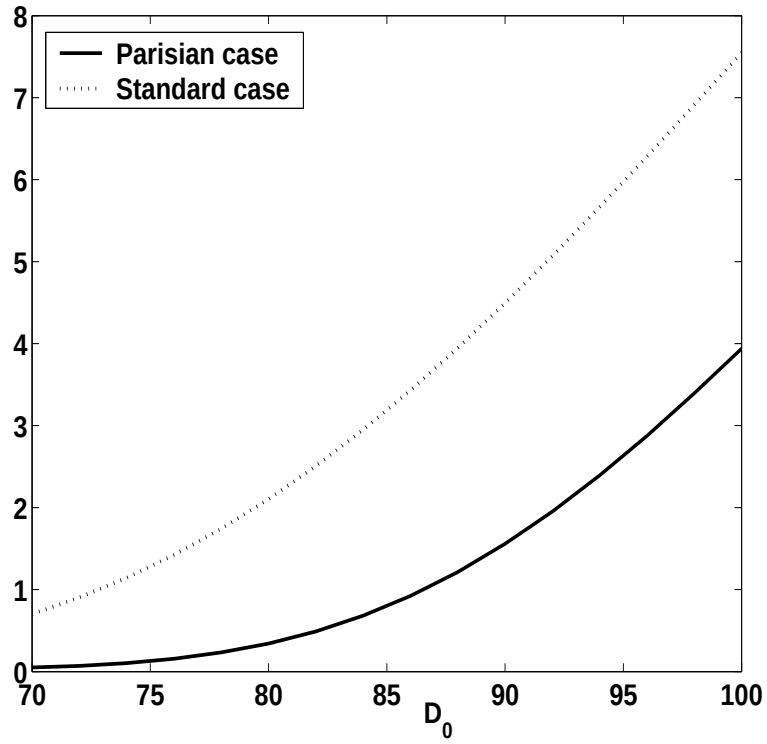
PARISIAN COVENANTS



Government Guarantee w.r.t. D_0

$(K = 20,\ D = 0.2,\ L = 85)$

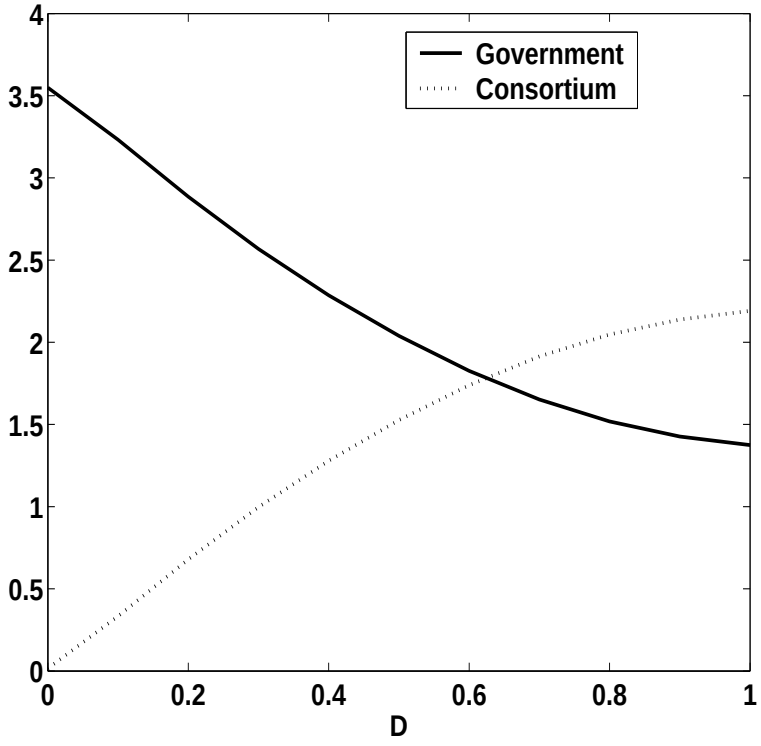
PARISIAN COVENANTS



Consortium Guarantee w.r.t. D_0

$(K = 20,\ D = 0.2,\ L = 85)$

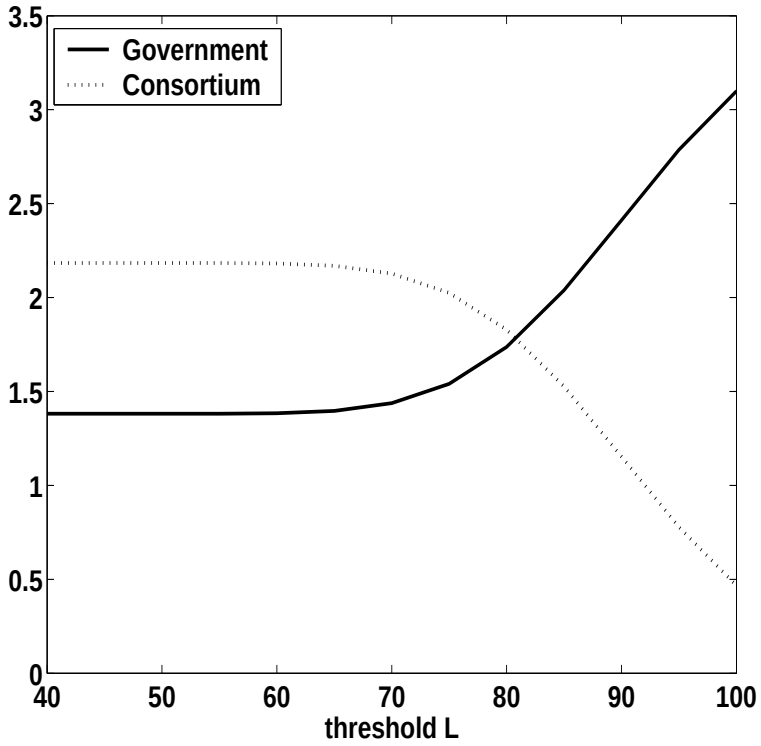
PARISIAN COVENANTS



Premia w.r.t. D

$(K = 10,\ D_0 = 85,\ L = 85)$

PARISIAN COVENANTS



Premia w.r.t. L

$(K = 10,\ D_0 = 85,\ D = 0.5)$

PARISIAN COVENANTS

Slightly Different Principle :
We now Build
a Cumulative Parisian Covenant

A Clock Counts the Total Time

Spent Below the Threshold L

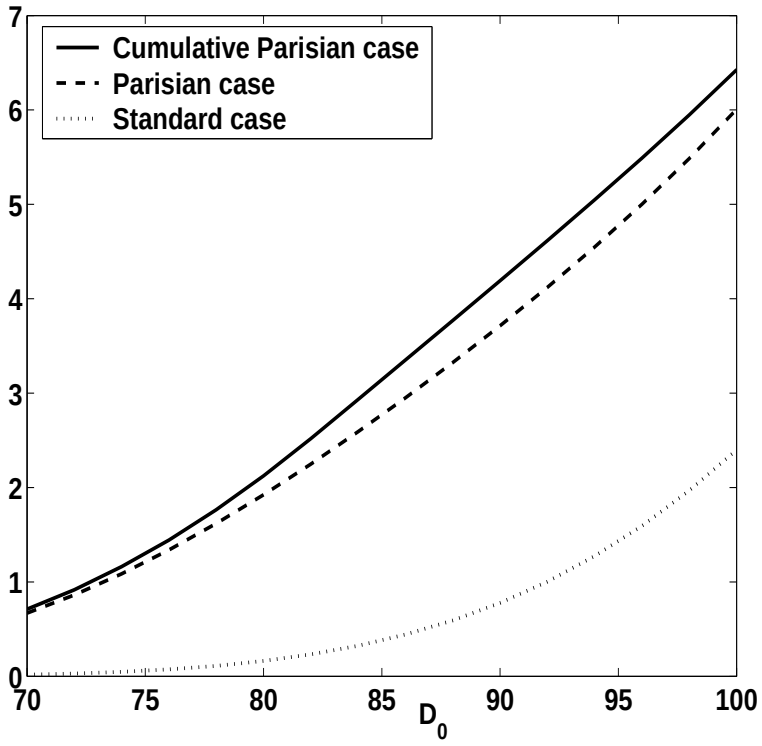
If this Time Exceeds D, the Bank

is Excluded from the Consortium

$\Rightarrow$ Pricing with Parisian Cumulative Options,

instead of Parisian Options

PARISIAN COVENANTS



Government Guarantee

$(K = 10,\ L = 85,\ D = 0.5)$

PENALTY SYSTEM

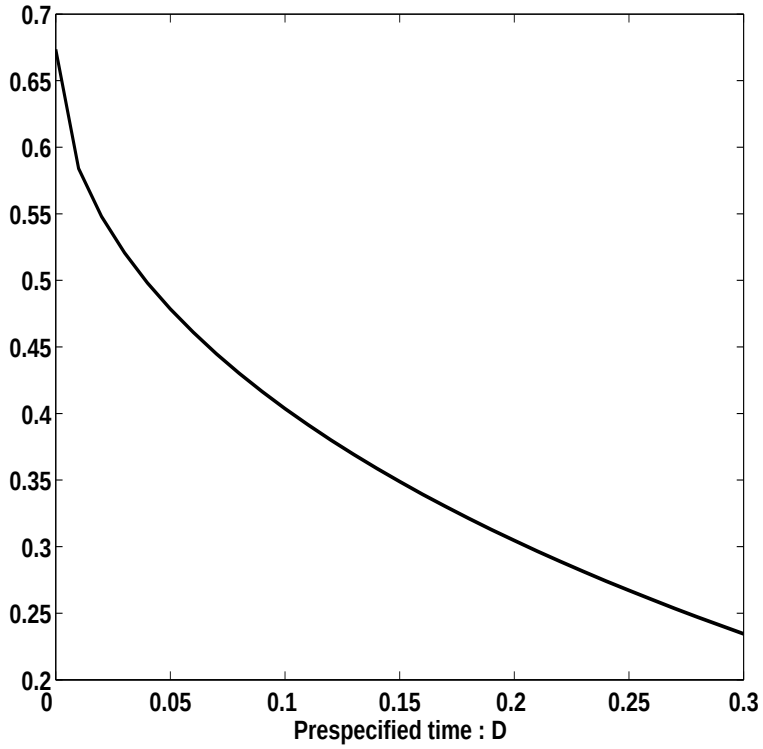
Parisian Covenants Might Lead
to Adverse Bank Behaviors

Because no Premia are Paid to the
Government, Banks are Incited to
Indirectly Levy Subsidies from it
and Increase their Risks

It is Therefore Important
to Design New Types of Covenants

We Suggest to Impose Penalties upon no
Realization of a Parisian Constraint
on the Assets (or Leverage)

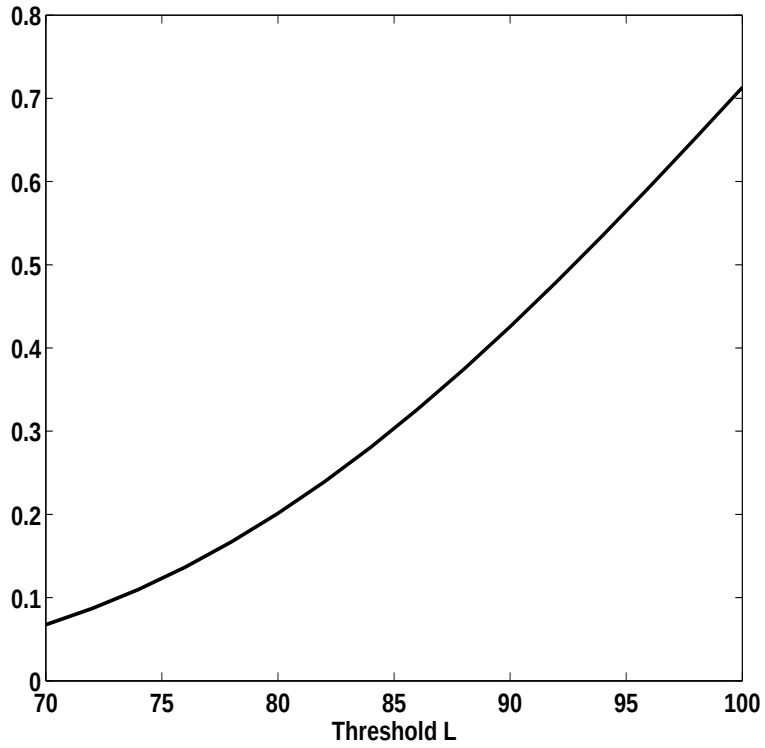
PENALTY SYSTEM



Penalty Value

$(D_0 = 70,\ L = 90,\ \sigma = 0.25)$

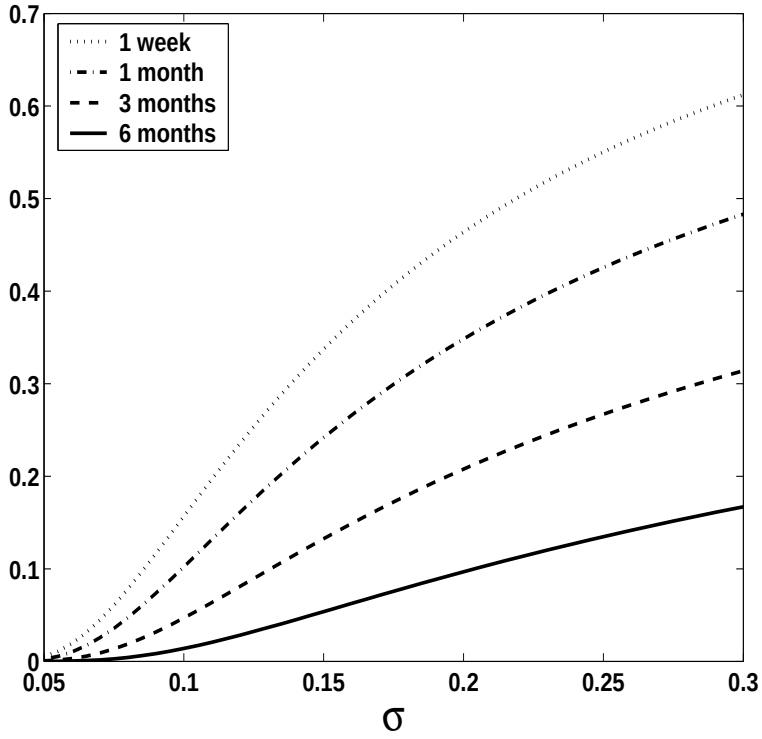
PENALTY SYSTEM



Penalty Value

$(D_0 = 70,\ D = 1/12,\ \sigma = 0.25)$

PENALTY SYSTEM



Penalty Value

$(D_0 = 70,\ L = 90)$