

DISCUSSION PAPERS IN ECONOMICS

Strategic R&D Delays Generate Market Power

Center for Economic Analysis



STRATEGIC R&D DELAYS GENERATE MARKET POWER

Abstract

We develop a theoretical model in which both the R&D resources to develop new product applications and the market structure of consumption goods manufacturing are determined endogenously. There exists uncertainty with respect to the development date of an inaugural product, although higher R&D spending shortens the expected product development stage. Once an inaugural product application is introduced, the costs of imitation decline. According to the model, the time between a patent application and the development of an inaugural product is influenced by two factors: returns to scale in R&D and "strategic delays." Strategic delays in new product development are most

fi

fi

ff

ff

ff

Related Literature

fi

fi

fi

fi

fi

ff

ff

fi

fi

6

ff

t

t

fi
i,t i,t fi i,t t i,t i,t i,t
i,t i,t
fi
fi

Product Development Research

fi m

fi

t

t

t

fi

fi

R_T
t c

fi

ffi

fi

ff

ff

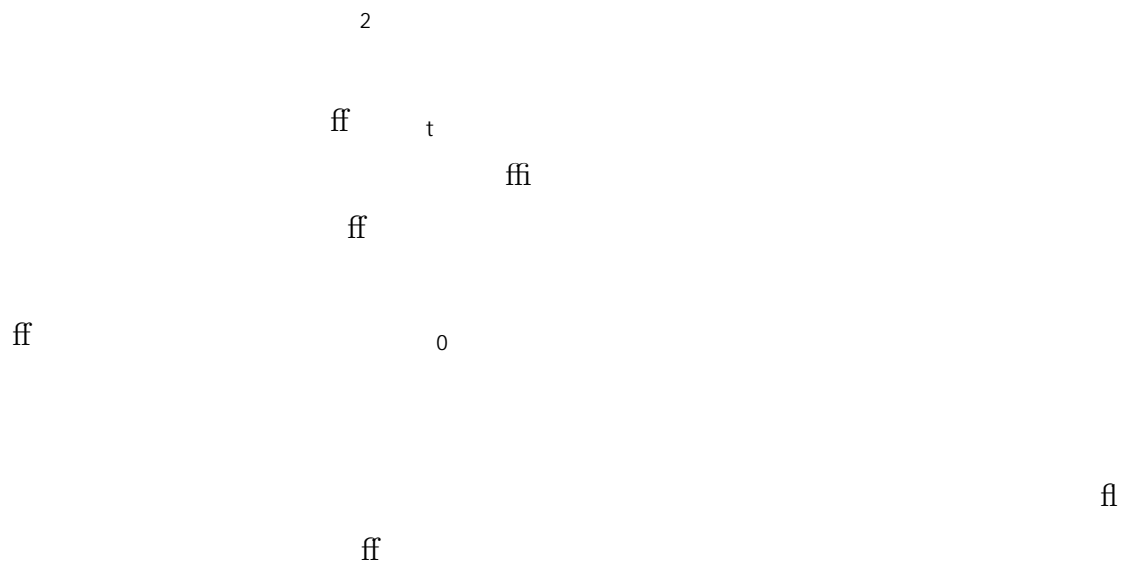
9

ff

ff

fi

fi



Proposition 3 The profit-maximizing product development investment, t , is strictly decreasing in the underlying level of technology, θ , when $\beta < 1$, $\beta > 1$, and $\beta = 1$.

Proof:

fi

ff

0

t
ff

ff
fl

ff

0

The Production Market Structure

0

t

fl

fl

Z_T

t 0

0 t

t 0 0

t

(ii) rises with more entry barriers, β , if the indirect effect of β on encouraging product development investment—and therefore attracting more imitation—dominates.

Proof:

\square

Proof:

fi

ffi

ffi

Conclusion

Appendix

A.1 Proposition 1:

fi

t

(i)

1

6 1

(ii)

Proof:

t

t

fi

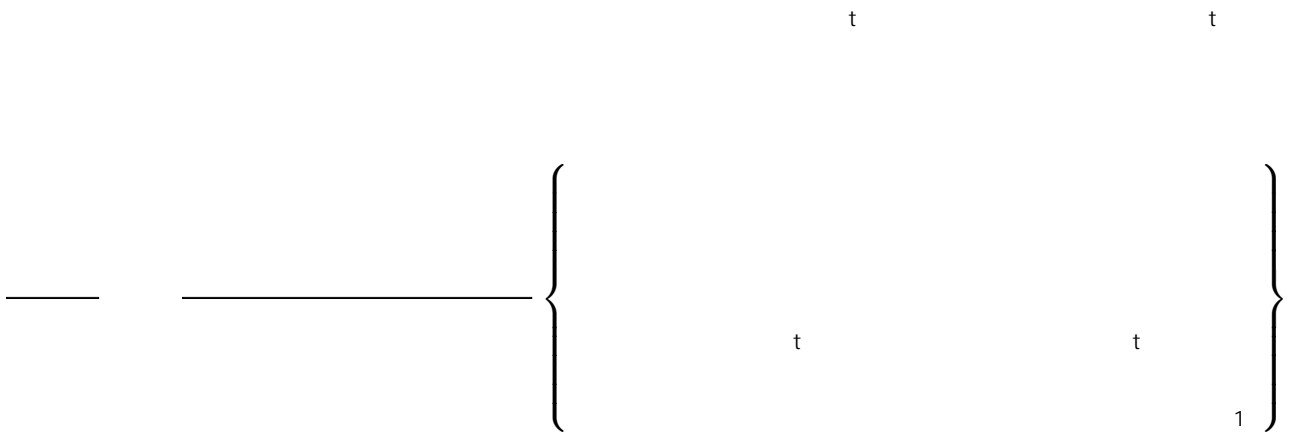
fi

{ {

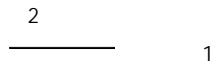
} 1

} '

2



fi



1

1 k

' " ' "

2

t

ff t

¥

A.3 Proposition 3:

fi

t

2

12 6

12 1 2

Proof:

12

_____ { 1 t t

t 1 }

A.5 Lemma 1:

$$t \quad 0$$

$$t$$

Proof:

$$0 \quad \frac{0 \quad 0}{0}$$

$$Z_T$$

$$0 \quad t \quad 0 \quad t \quad t \quad 0 \quad 0$$

$$t \quad 0 \quad t \quad t \quad 0$$

$$t \quad 0 \quad 0 \quad 0 >$$

$$t \quad 0 \quad 0 >$$

$$t \quad 0 \quad t \quad t \quad 0 \quad fi$$

$$t \quad 0 \quad }$$

Proof:

$t = 0$

$t = 0$

$t = 0$

$t = t$

$t = 0$

t

ff

fi

t 0

t 0

t 0

¥

References

Aghion, P. and P. Howitt.
Econometrica

Aghion, P. and P. Howitt.
Journal of Economic Growth

Aghion, P., R. Blundell, R. Gri

Lerner, J. American Economic Review,

Matutes, C., P. Regibeau, and K. Rockett.
ff The RAND Journal of Economics,

Mokyr, J. The Lever of Riches

Peretto, P
Journal of Monetary Economics,

Peretto, P
European Economic Review,

Rosenberg, N. Inside the Black Box: Technology and Economics

Weeds, H
Review of Economic Studies,

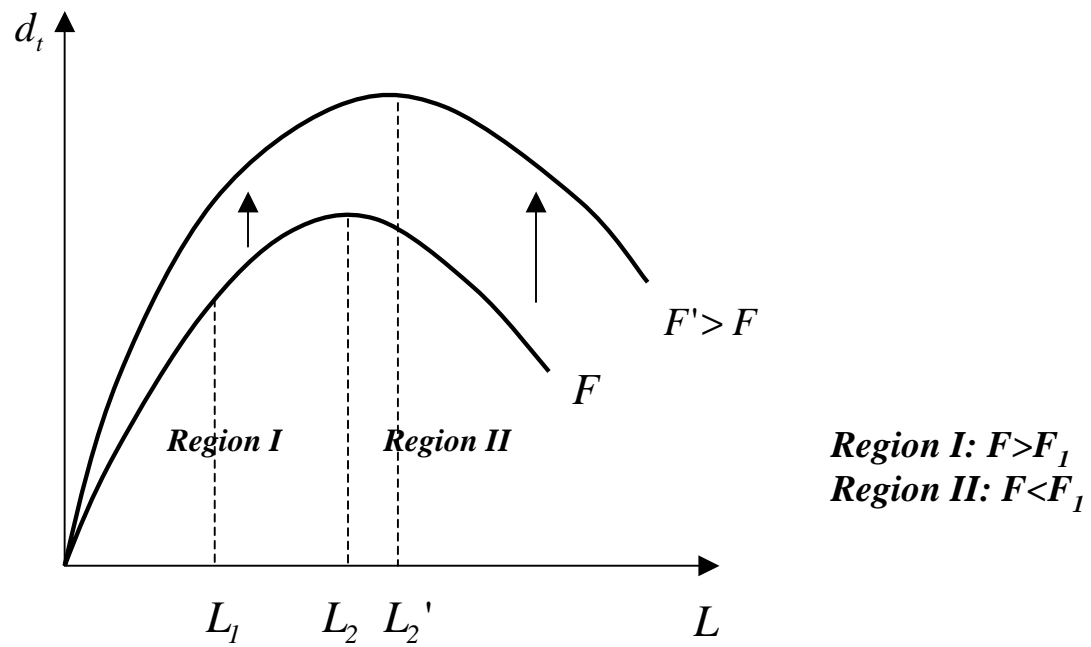


Figure 1: The relationship between R&D and legal patent length

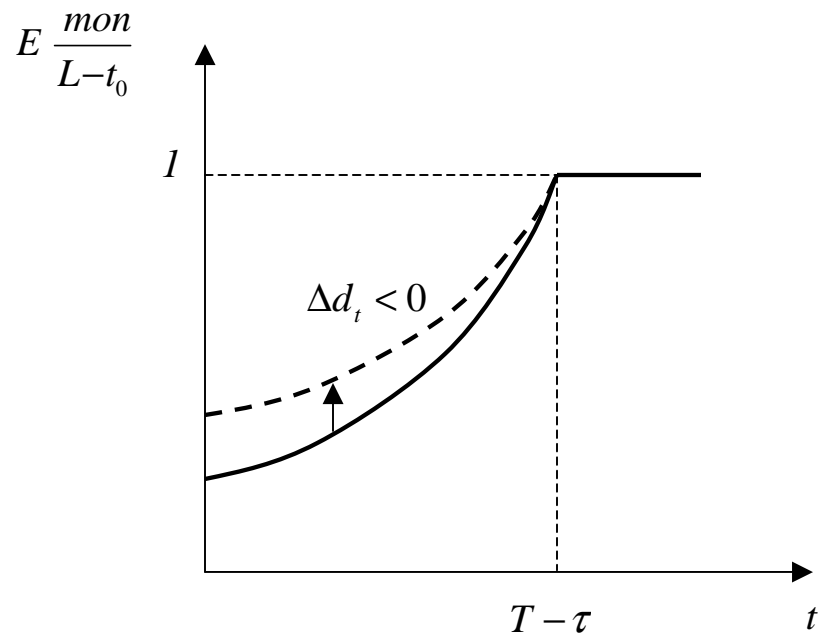


Figure 2.a: The effect of strategic delay on the effective patent protection over time

Figure 2.b: The effect of extending legal patent length on R&D and

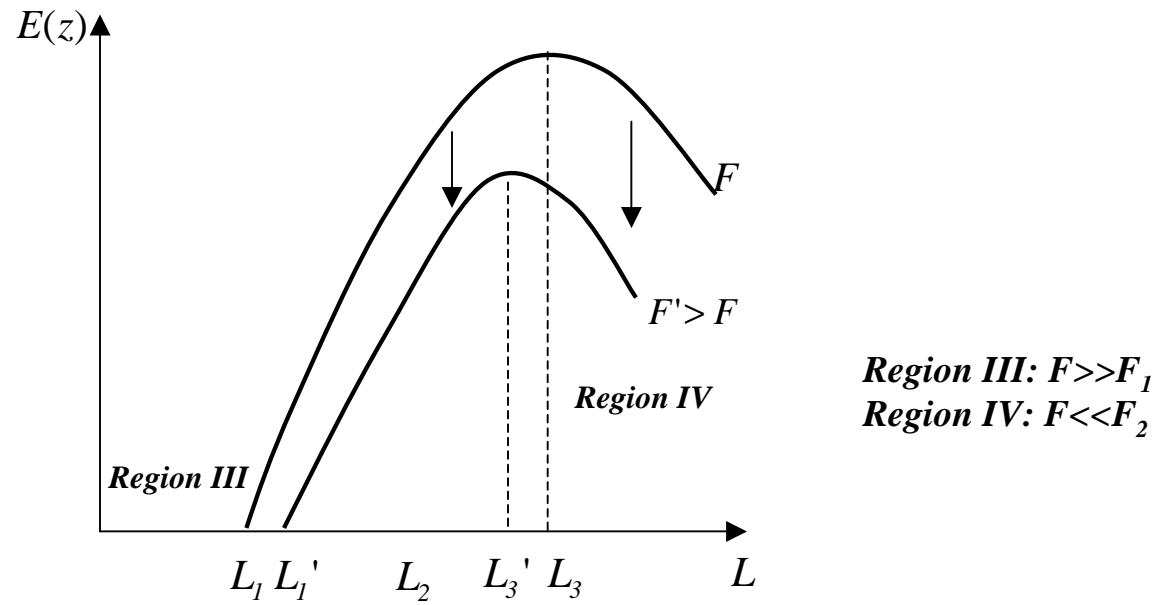


Figure 3: The relationship between expected number of imitators and legal patent length

