การจัดหาสินค้าและคุณภาพของผู้ประกอบการในเขตจังหวัดพระนครศรีอยุธยา สินค้าไทย ASEAN ยุค 4.0

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บทคัดย่อ

กิตตินันต์ พิศสุวรรณ (การกำหนดราคาและการส่งสัญญาณ ด้วยขวากหนาม สมุดรายวันของทฤษฎีเศรษฐศาสตร์ 2013) ศึกษาแบบจำลองที่ผู้ซื้อกับความต้องการของหน่วยและผู้ขายกับหน่วยอุปกรณ์ ผู้ขายอาจผลิตเป็นสูงหรือต่ำมีคุณภาพดี ผู้ซื้อได้รับสัญญาณคุณภาพ แต่เทคโนโลยีการส่งสัญญาณค่อนข้างมีไม่จำกัดหรือข้อมูลจำกัดไม่สามารถปิดเป็นความลับสำหรับ ผู้บริโภคซึ่งสามารถหาความจริงได้ในยุคปัจจุบันซึ่งเป็น สัญญาณเป็นทั้งหมดเปิดเผย หรือ ผู้ศึกษาวิจัยกับเทคโนโลยีสัญญาณแบบเปิดเผยที่สูงและต่ำสัญญาณอยู่เสมอได้ มีความน่าเป็นบวก เป็นผล ทุกครั้งที่มีผลิตสินค้าคุณภาพสูง ยังคุณภาพต่ำสินค้าที่ผลิต แทนราคาผู้วิจัยศึกษาการซื้อขาย โดยการประมูล มีสอง equilibria และผู้เขียนประเมินการสูญเสียประสิทธิภาพเนื่องจากข้อมูลไม่เปิดเผย

Abstract

Kittinant Phitsuwan (Pricing and signaling with frictions, *Journal of Economics Theory* 2013) study a model featuring buyers with unit demands and sellers with unit supplies. The sellers may produce a high- or a low-quality good. The buyers get a signal about quality but the signalling technology is quite specific; the signal is either completely revealing or uninformative. The author studies the same model with a symmetric signalling technology where high and low signals are always got with positive probability. As a consequence, whenever high-quality goods are produced also low-quality goods are produced. Instead of price posting the author studies trading by auctions. There are two equilibria, and the author quantifies the efficiency loss due to asymmetric information.

Keywords :ผู้ประกอบการ คุณภาพสินค้า ทางเลือกผู้บริโภค

: Product quality, alternative operators, consumers,

Introduction

Information asymmetries are an unavoidable feature of many important markets. Private information about economically relevant aspects typi-cally leads to sorting or signalling depending on whether the uninformed party or the informed party proposes the terms of trade. In both cases the bad types want to pretend to be good types; when separating them from the good types succeeds a price has to be paid in terms of overall efficiency.

In this paper we study a setting where there are different types of sell-ers. The good types offer a high-quality good and the bad types a low-quality good. As quality is not easily detected by buyers, low-quality goods are necessarily offered in equilibrium even when it would be so-cially optimal that all the sellers produce high-quality goods. We differ from most of the literature in that the types are endogenous as the sellers decide which quality to produce. Examples abound from used cars and other durable goods to restaurants and language courses.We analyse the problem in a directed search model with a large number of buyers and sellers. Each seller is capacity constrained and has a unit of a good for sale. The buyers contact the sellers in an uncoordinated fashion, get an imperfect signal about the quality and then trades are consummated in auction.A setting similar to ours is analysed in Delacroix and Shi (2013). There are two main differences. First, in their model the sellers post prices that direct the buyers' contact decisions. As the sellers are informed about the quality they offer, the prices acts as signals, too. In our model the sellers do not signal the quality but the trades are consummated in auction and buyers contact the sellers randomly.Secondly, the signal technology in their model is quite specific; the buyers get either a signal that perfectly reveals the quality of the good or a completely uninformative signal. The result of this assumption is that all.the sellers produce either high-quality goods or low-quality goods. We consider a signal technology which is symmetric. Both high- and low-quality goods may result in high and low signals, and, as a consequence, whenever high-quality goods are produced also low-quality goods are produced.There are two reasons not to consider price posting. First, as prices are chosen by the informed party they have a signalling role. There is a huge number of equilibria, and clear cut results are consequently difficult to obtain.[1]Second, there is the problem of commitment. With posted prices there would sometimes be no trading upon low signal even though the low-quality goods provide some utility. Auction does not suffer from this problem.If high-quality goods are produced in equilibrium there are just two equilibria when the terms of trade are determined in an auction. In a high-activity equilibrium more than half of the sellers produce a high-quality good, and in a low-activity equilibrium less than half of the sellers pro-duce a high-quality good.

2 Review

There is a unit mass of sellers and a mass q of buyers. The sellers produce a good for sale, and the good can be of high or low quality. Production of a high-quality good costs c > 0, while the cost of producing a low-quality good is normalised to zero. Buyers have unit demands; consumption of a high-quality good yields utility 1, and consumption of a low-quality good yields utility v 2 [0, 1); the low quality good could also yield negative utility but we ignore that case.The trades are consummated in an auction with no reservation price a seller meets just one buyer the latter one makes a take-it-or-leave-it offer,while if a seller meets several buyers they bid the price to their reservation level. The buyers do not observe the quality but they get an informativem signal about it. If a good is of high quality (hq) they get a high signal (hs) with probability $s > \frac{1}{2}$, and if a good is of low quality (lq) they get a low signal (ls) with probability $s > \frac{1}{2}$ .One feature of the equilibrium is immediately clear. It is not possible that all the sellers produce a high-quality good. If this were the case then the buyers would buy also when they receive a low signal, and then a seller could deviate by producing a low-quality good saving c. We denoteby w 2 [0, 1] the proportion of sellers who produce a high-quality good.

A buyer has to evaluate the probabilities by which he receives a high-quality good conditional on the signal he receives. The relevant probabili-ties are calculated next. A buyer expects to get a high signal with probabil-ity Pr(hs) = sw + (1 s)(1 w). The probabilities of a high-quality good on given signals are given by Pr (hq jhs) = $\frac{\text{Pr(hsjhq)Pr(hq)}}{\text{Pr(hs)}} = \frac{sw}{sw+(1\ \ s)(1\ \ w)}$,

and Pr (hq jls) = $\frac{(1\ \ s)w}{(1\ \ s)w+s(1\ \ w)}$.

The buyers contact the sellers randomly which results in meetings that are governed by the urn-ball meeting technology. A ~~seller is~~ contacted by k buyers with probability e $\frac{q\,q^{k}}{k\,!}$.

2.1 Equilibrium

In auction the optimal behaviour is to bid zero if there are no other bidders, and to raise one's bid until it reaches one's valuation if there are other bid-ders. As every buyer is identical the optimal behaviour in auction results in the seller getting his reservation utility or all the buyers getting their reservation utilities. Updating the beliefs, given the signal, is mechanical as the agents' strategies are so simple. This leaves the production decision as the only non-trivial choice.

How to conduct research

Definition 1. A symmetric equilibrium consist of the buyers' bidding strategy in auction, and the sellers' strategy of producing a high-quality good. Given the proportion of high-quality sellers wa buyer's offer in auc-tion is zero if he is the only buyer, and if there are other buyers the optimal strategy is to raise the bid up to the buyer's valuation. Seller i's strategy consists of the probability $s_i = w$ of producing the high-quality good, such that it is a best response to the other sellers' and buyers' strategies.

Assume that proportion w of sellers produces a high-quality good. If a buyer gets a high signal he expects the good to be of high quality with probability $\frac{sw}{sw+(1-s)(1-w)}$, and if he receives a low signal he expects the good to be of high quality with probability $\frac{(1-s)w}{(1-s)w+s(1-w)}$. If a seller meets only one buyer this buyer offers the seller's reservation value zero. If two or more buyers contact the seller they engage in a bidding contest where the price rises to $\frac{sw+(1-s)(1-w)v}{sw+(1-s)(1-w)}$ if the signal is high, or to $\frac{(1-s)w+s(1-w)v}{(1-s)w+s(1-w)}$ if the signal is low.

Consequently, high- and low-quality sellers' expected pay-offs are given by

$$(1-e^{-q}-qe^{-q})\left(s\frac{sw}{sw+(1-s)(1-w)}v+(1-s)\frac{(1-s)w}{(1-s)w+s(1-w)}v\right)-c \qquad (1)$$

and

$$(1-e^{-q}-qe^{-q})\left(s\frac{(1-s)w}{(1-s)w+s(1-w)}v+(1-s)\frac{sw}{sw+(1-s)(1-w)}v\right) \qquad (2)$$

In equilibrium the utilities have to be equal which is equivalent to

$$(1-e^{-q}-qe^{-q})(2s-1)\left(\frac{sw}{sw+(1-s)(1-w)}v-\frac{(1-s)w}{(1-s)w+s(1-w)}v\right)=c \qquad (3)$$

A buyer receives strictly positive utility only when no other buyers contact the seller, and his utility is given by

$$e^{q}\,[w + (1 \quad w)v] \tag{4}$$

Condition (3) determines the possible equilibrium fractions of high-quality producers. Expressing (3) as a second degree equation in w we get

h i $w^{2}(2s\ 1)^{2}\ (1\ e^{q}\ qe^{q})(1\ v)\ c$

h i

$$w(2s \quad 1)^{2} \ (1 \quad e^{q} \quad qe^{q})(1 \quad v) \quad c \ + s(1 \quad s)c = 0 \tag{5}$$

Next we show that there are two viable solutions to the equation when c is within reasonable limits. Denoting B = $(2s\ 1)^{2}\ (1\ e^{q}\ qe^{q})(1\ v)$ c the solutions are given by

$$w = \frac{B \quad p\overline{\qquad\qquad}}{2 \quad 4\ s(1 \quad s)} \tag{6}$$

Now there are two possibilities: Either B 0 or B > 0. The first case re-sults in solutions one of which is greater than unity, and the other negative. Consequently, the only possibility is that B > 0. This implies a restriction for the cost, c < $(1\ e^{q}\ qe^{q})(1\ v)$. The discriminant also has to be positive which implies c $(2s\ 1)^{2}(1\ e^{q}\ qe^{q})(1\ v)$. The latter condition is stricter and this is what we assume in the sequel.

Assumption 1. The cost of producing a high-quality good satisfies c <
$(2s \quad 1)^{2}(1 \quad e^{q} \quad qe^{q})(1 \quad v)$.

We gather the results of the above analysis in

Proposition 1. Suppose that trades are consummated by auction and Assumption 1 holds. Then there exists a low-activity equilibrium and a high-activity equilibrium where the proportions of high-quality good pro-p ducers are given by $w = \frac{B \quad \sqrt{B2 \quad 4Bs(1 \quad s)c}}{2B}$, $B = (2s \quad 1)^2 \ (1 \quad e^{q} qe^{q})(1 \quad v) \quad c$.

Notice that as c approaches $(2s \ 1)^2 \ 1 \ e^{q} \ qe^{q} \ (1 \ v)$ or the discriminant approaches zero there is just one solution $w = \frac{1}{2}$. When the accuracy of the signal grows, or s approaches unity there are two solutions $w = 0$ and $w = 1$. In the low activity equilibrium no-one produces a high-quality good even if the cost of production is very small. This is, of course, just a limit of equilibria under asymmetric information. When the signal is perfect there is only one equilibrium, i.e., everyone produces a high-quality good as long as $c < (1 \ e^{q} \ qe^{q})(1 \ v)$, and if the inequality is reversed everyone produces a low-quality good.

The range of costs that allow equilibria with high-quality goods is determined by Assumption 1. The higher the utility from the low-quality good the smaller the cost of producing the high-quality good has to be if Assumption 1 is to be satisfied. In the limit when v approaches unity the cost must go to zero. To the contrary, when the number of buyers or q grows without limit the range of feasible costs grows: this makes sense as the sellers are more willing to incur the costs as the probability of meeting two or more buyers increases.

Research result

Let us assume that a planner can choose the proportion of high-quality good sellers. As each meeting results in a trade regardless of the signal the welfare, or the number of trades, is given by

$$(1 \quad e^{q})\,[w + (1 \quad w)v] \quad wc \tag{7}$$

and the derivative of (7) with respect to w by $(1\ e^{q})(1\ v)\ c$. This is positive if $(1\ e^{q})(1\ v) > c$ and the planner's solution is that there should be as many high-quality producers as possible. If the inequality is reversed then the planner's solution is that no-one produces a high-quality good.The social optimum and the decentralised solution are clearly different. For instance, it is socially optimal to produce high-quality goods as long as $c < (1\ e^{q})(1\ v)$, while in the decentralised market this happens only under more stringent condition, or when $c < (2s\ 1)^2(1\ e^{q}qe^{q})(1 \quad v)$.Next we numerically study the degree of inefficiency in two cases, namely under relatively low demand, $q = 1$, and relatively high demand, $q = 10$. Under Assumption 1 the high activity equilibrium is the more efficient one, and we compare this to the social optimum. The ratio of the value of trades in equilibrium to that in the social optimum is given by

$$\frac{1 \quad {}^{e} \quad q \quad \overset{1\ e^{q}}{} \quad [w + (1 \quad w)\overset{v}{}\,] \quad \overset{c}{w} \quad {}^{c}}{} \tag{8}$$

where $w = \dfrac{B + \sqrt{B^2 \quad 4Bs(1 \quad s)c}}{2B}$.

We fix the the value of the low-quality good to $v = 0.1$ as low values of v lead to higher efficiency loss than high values. We then allow the signal to be either relatively inaccurate, $s = 0.6$, or relatively accurate, $s = 0.9$. By Assumption 1, under relatively low demand the values of c in the two cases have to satisfy $c < 0.00951268$ and $c < 0.152203$. Under relatively high demand the cost has to satisfy $c < 0.035982$ and $c < 0.575712$, respectively. The following figures depict how the efficiency declines with c;

value unity in the vertical axis indicates that the value of trades in the de-centralised solution is the same as in the social optimum. Quite naturally efficiency decreases when the cost of producing the high-quality good in-creases as more sellers produce the low-quality good. The more important observation is the range of costs that supports at least some high-quality production. Under both low and high demand it becomes more than ten-fold when accuracy of the signal increases from s = 0.6 to s = 0.9.

Conclusion

In this note we consider a setting where the sellers' types, i.e., the qual-ities they offer, are endogeneously determined, and the buyers receive a non-degenerate and symmetric signal about the type. To avoid issues of signalling we postulate that the terms of trade are determined in auctions rather than by price posting. We find that there are just two equilibria, a high- and a low-activity one. When knowledge about quality is imperfect there are necessarily sellers who provide low-quality goods. The higher the cost of high-quality production, and the less accurate the buyers' in-formation about quality the more severe the problem is. There are param-eter values where it would be socially optimal that everyone produces a high-quality good, but in the decentralised market everyone produces a low-quality good.

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