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Export Insurance Policy When Exporting to Lesser-Known Markets

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Az Tanınmış Piyasalara İhracatta Uygulanan İhracat Sigorta Politikası

Abstract

There are crucial differences between exporting to a lesser-known market and exporting to a well-known market. I define a well-known (lesser-known) market if exporters have complete (incomplete) information about importers' characteristics such as contract viability. This risk premium between a well-known market and a lesser-known market causes lower export volume to lesser-known markets. I find that government-supported export insurance policies can increase the total volume of exports to lesser-known markets. Moreover, this paper argues that mostly medium-sized firms are getting benefits from this policy.

Key Words : Exports, Insurance, Lesser-Known Markets, Incomplete Information.

JEL Classification Codes : D81, F10, F13.

Özet

İhracatın yapılacağı piyasaların tanınmış ya da az tanınmış olması arasında çok önemli farklılıklar vardır. Bu çalışmada ihracat yapanların ithalatçıların özellikleri hakkında-örneğin kontratların uygulanabilirliliği-tam (eksik) bilgiye sahip oldukları piyasalar tanınmış (az tanınmış) piyasalar olarak kabul edilmiştir. Çok tanınan ve az tanınan piyasalar arasındaki bu risk primi az tanınan piyasalara daha az ihracat yapılmasına neden olabilmektedir. Bu çalışmada devlet destekli ihracat sigorta politikalarının az tanınmış piyasalara yapılan toplam ihracat hacmini arttıracağı sonucuna ulaşılmıştır. Ayrıca bu politikadan en çok orta ölçekte olan firmaların fayda sağlayacağı argümanı savunulmuştur.

Anahtar Sözcükler : İhracat, Sigorta, Az Tanınmış Piyasalar, Eksik Bilgi.

1. Introduction

For an exporter, there are crucial differences between exporting to a lesser-known market and exporting to a well-known market. In this paper, I define a market as a well-known one, if the information about importers' characteristics is fully known by exporters. This information set includes the reliability of importers such as contract viability, payment delays, etc. However, for a lesser-known market, information about importers' characteristics is not completely known by exporters. In other words, there is incomplete information about importers in a lesser-known market. Incomplete information about importers makes it riskier to export to a lesser-known market compared to a well-known market. Even though only a subset of importers in a lesser-known market might violate the contract or delays payment, this incomplete information causes a risk premium between lesser-known markets and well-known markets. This risk premium lowers exports to lesser-known markets relative to well-known markets.[1] Closely related to my argument, Crozet, Koeing, Rebeyrol (2008: 22-29) presents the empirical evidence for French exporters. In their analysis, if the insecurity index goes up for an import destination, then probability of exporting to those destinations decreases.[2]

In this paper, I ask and answer the following questions: Is there a government policy to share the risk with exporters and thereby increase the volume of exports to lesser-known markets? If there is, then which type of firms are getting the most benefits from this policy? The main argument of this paper is that if government provides an export insurance policy for exporters when exporting to lesser-known markets, this insurance policy can increase the total volume of exports to lesser-known markets. This paper also argues that mostly medium-sized firms are getting benefits from this policy. Larger firms can take the risk by themselves, however medium-sized ones cannot. Moreover, most of the small-sized firms still find it too risky to export to lesser-known markets.

This paper's goal is to emphasize the idea of government-supported export insurance policy when exporting to lesser-known markets. The proposed export insurance policy in this paper is as follows: Exporters find it risky to export lesser-known markets due to the uncertainty of contract viability. Given this argument, government can provide an export insurance policy such that if exporters ex-ante pay some insurance costs and cannot completely get their payment back from importers, then government pays some portion of the total payment to exporters. I provide a simple model to show the clear relationship between export insurance policy and the total volume of exports to lesser-

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[1] *There are some other potential explanations for lower exports to lesser-known markets relative to well-known markets other than the mentioned risk premium. In this paper, I solely focus on the incomplete information about the reliability of importers: Contract viability.*

[2] *IRCG (International Country Risk Guide) is used as a proxy for insecurity in their analysis. ICRG provides annual indices of political stability, contract viability, payments delays, corruption, bureaucratic efficiency, and legal system, etc. In this paper, I focus on contract viability.*

known markets. The key ingredient of this model is that exporters do not have complete information about importers but have beliefs instead. Moreover, in the model there is a portion of payments paid immediately by importers to exporters in return for imported goods. However, there is a contract between importers and exporters and the rest of the payment will be done in the future according to this contract. I assume that there are 2 types of importers: Good and bad types. Good type pays the rest of the payment in the future as written in the contract, but bad type does not pay the rest of the payment and violates the contract. In order to simplify the difference between a well-known and a lesser-known market in the model, the only source of incomplete information is assumed to be about importer types.[3]This environment (risk premium between well-known markets and lesser-known markets) lowers export volume to lesser-known markets due to the uncertainty of contract viability. However, with a government-run export insurance policy, exporters would find it safer to export to lesser-known markets since risk is shared with government. Consequently, this policy causes an increase in total volume of exports to lesser-known markets.

The remainder of this paper is organized as follows: Section 2 describes the model and discusses the policy implications of export insurance. Section 3 provides a numerical example and section 4 concludes.

2. Model

Sections 2.1. and 2.2. analyze the cases “no insurance” and “insurance”, respectively under incomplete information. In order to highlight the main features of the model and differences between these 2 cases, section 2.1. and 2.2. assume a representative exporter. In order to achieve the main goal of this paper, section 2.3. analyzes the model with heterogeneous exporters instead of a representative exporter assumption. Section 2.4. discusses the policy implications of export insurance.

2.1. Model: No Insurance Case

Suppose that there are two countries: Home (H) and Foreign (F) country. In country H, there is a representative exporter, firm i, and in country F, there is a representative importer, m.[4] A representative exporter, firm i in H, produces good y. In

[3] *If an exporter believes that the probability of payment of the remaining portion is high (low), then it can be interpreted as a well-known (lesser-known) market.*

[4] *In order to emphasize the importance of this paper's idea clearly, I did not explicitly model domestic production, importers in H and exporters in F. However, all of the qualitative results remain same with those extensions. Moreover, this set-up can be extended to an N country case.*

order to produce one unit of *y*, firm *i* pays cost, *c*.[5]A representative importer, consumer *m* in F, demands one unit of *y* from country H. For one unit of *y*, importer *m* in F offers *p* to exporter *i* at the beginning of the period.

The scenario proceeds as follows:[6] At the beginning of the period, importer *m* demands one unit of *y* from H and offers *p* for one unit of *y*. Exporter *i* either accepts or rejects this offer depending on the expected profit. If exporter *i* accepts the offer, then importer *m* pays some portion of the offer, γp immediately. However, the rest of the offer $(1-\gamma)p$ will be paid later according to the contract. Exporter *i* believes that for a α probability, importer *m* will adhere to the contract and pay the rest of the offer, $(1-\gamma)p$.[7]On the other hand, with a $(1-\alpha)$ probability exporter *i*, believes that importer *m* will not the pay the rest of the offer.[8] In the case of acceptance, exporter *i* produces one unit of *y* and pays the cost *c*. After sending the good *y*, importer *m* may or may not pay the rest of the offer depending on type. Depending on this probability distribution, offer and cost, firm *i* maximizes the expected profit and decides to accept or reject the offer. If firm *i* rejects the offer, importer *m* does not pay *p* and does not consume *y*, and exporter *i* does not pay the cost *c*.

At the beginning of the period, given α, p and *c*, firm *i* maximizes the expected profit, $E(\pi)$. Competitive markets imply that:

$$E(\pi) = \gamma p + \alpha(1-\gamma)p - c = 0. \tag{1}$$

Hence, for firm *i*, the condition for accepting the offer is $\gamma + \alpha(1-\gamma) \geq \frac{c}{p}$.

2.2. Model: Export Insurance Policy

There is one crucial difference compared to the previous case.[9] The government in country H provides an insurance policy for exporters. More explicitly, if an exporter *i* pays some insurance cost, λ, to the government, then under the case of not getting back their remaining offer $(1-\gamma)p$, government pays some portion of that offer, $(1-\gamma)p\ \theta$,

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[5] c *can be interpreted as unit labor cost and corresponds to 1/productivity. Moreover, I assume that* $c \in (0, c^u]$, *where* c^u *is the upper bound for the cost.*

[6] *See appendix figure 1 for the timeline.*

[7] $0 \leq \alpha, \gamma \leq 1.$

[8] *In reality, it is too costly and time consuming to take these contract issues to the international courts. Therefore, in the model net return from the courts is normalized to 0 for simplicity.*

[9] *See appendix figure 2 for the timeline.*

as an insurance payment.[10] At the beginning the period, given α, p, c, θ and λ, exporter *i* maximizes the expected profits and makes two decisions: First, depending on the expected profitability from the insurance policy, firm *i* chooses either "Joining the insurance mechanism" (I) or "Not joining the insurance mechanism" (NI). Second, depending on the expected profitability of exporting good *y* (can be exported with I or NI), firm *i* decides to accept (A) or reject (R) the offer. Hence there are 3 cases: (A,I), (A,NI), (R,NI).[11]

For exporter *i*, competitive markets imply that:

$$E(\pi) = \gamma p + \alpha(1-\gamma)p - c + \max(0, (1-\alpha)(1-\gamma)p\theta - \lambda) = 0. \quad (2)$$

Clearly, if the insurance mechanism is not profitable in the expected terms (i.e the expected return of insurance $\leq$ cost of insurance; $(1-\alpha)(1-\gamma)p\theta \leq \lambda$, then exporter *i*'s problem reduces to:[12]

$$E(\pi) = \gamma p + \alpha(1-\gamma)p - c = 0, \quad (3)$$

as in the case where there is no insurance policy.

2.2.1. Different Cases

There are potentially 3 different cases (A,I), (A,NI), (R,NI).

1st case: (A,I)

This case implies two things: First, exporter *i* joins the insurance mechanism provided by the government. Second, exporter *i* accepts the offer. In order to join the insurance mechanism, the expected return of insurance has to be greater than the cost:

$$(1-\alpha)(1-\gamma)p\theta > \lambda \quad (4)$$

Second, the expected non-negativity profit condition implies that:

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[10] *The government's information about actual distribution of types can be reflected in the cost of insurance: The more (less) information, the lesser (higher) cost,* λ. $0 \leq \theta \leq 1$.

[11] *For example (A,I) can be interpreted as accepting + joining the mechanism case. Other cases can be interpreted similarly. In the rejection case, clearly no insurance is paid, hence (R,I) is not possible.*

[12] *If the expected return of insurance = cost of insurance, then an exporter is indifferent. In this case, I assume that exporter does not join the insurance mechanism.*

$$\gamma p + \alpha(1-\gamma)p + (1-\alpha)(1-\gamma)p\theta \geq c + \lambda. \quad (5)$$

For the (A,I) case, it is known that $(1-\alpha)(1-\gamma)p\theta > \lambda$. Hence, there might be possible cases for the following relation: $\gamma p + \alpha(1-\gamma)p \gtreqless c$. The focus point of this paper is the subcase in which it is only optimal to accept the offer with an insurance mechanism. Henceforth, I call this subcase 1'. The conditions corresponding to this subcase are: $\gamma p + \alpha(1-\gamma)p \leq c$ and $\gamma p + \alpha(1-\gamma)p + (1-\alpha)(1-\gamma)p\theta \geq c + \lambda$ simultaneously. The first condition implies that exporter *i* rejects the offer without an insurance mechanism. However, the second condition implies that exporter *i* accepts the offer with an insurance mechanism. Consequently, (A,I) case shows that insurance mechanism can be effective since insurance mechanism can affect the optimal choice of an exporter as in subcase 1'.

2nd case: (A,NI)

The second case again implies two things: Exporter *i* decides not to join the insurance mechanism provided by the government, but exporter *i* still accepts the offer. In order not to join the insurance mechanism, the expected return of insurance has to be less than or equal to the cost of insurance:

$$(1-\alpha)(1-\gamma)p\theta \leq \lambda. \quad (6)$$

Second, the expected non-negativity profit condition implies that:

$$\gamma p + \alpha(1-\gamma)p \geq c. \quad (7)$$

This case shows that under some conditions, an insurance mechanism can be ineffective since mechanism might be too costly to use in expected terms. Consequently, an insurance mechanism cannot affect the optimal choice of an exporter. An insurance mechanism can be ineffective for several reasons: It can be very costly (relatively high λ) or insurance coverage can be low (relatively low θ). Moreover, if importers have a good reputation (i.e. importer is a good type and this is publicly known), then $\alpha \to 1$. This implies that there is no need for this insurance mechanism.[13]

[13] *Clearly, if γ =1, then there is no need for an insurance mechanism.*

3rd case: (R)

Third case is rejecting the offer. There can be two possibilities for this case to happen. First, an insurance mechanism can be profitable but the expected non-negativity profit condition may imply the following:

$$\gamma p + \alpha(1-\gamma)p + (1-\alpha)(1-\gamma)p\theta < c + \lambda. \tag{8}$$

Second, an insurance mechanism cannot be profitable and the expected non-negativity profit condition may still imply the following:

$$\gamma p + \alpha(1-\gamma)p < c. \tag{9}$$

Under both subcases, exporter *i* rejects the offer: In the first one, even the existence of the insurance mechanism does not help the exporter to accept the offer. In the second subcase, the insurance mechanism by itself is not profitable, and it is not profitable to export without insurance as well.

As mentioned before, the focus of the paper is the subcase where exporter *i* cannot export without an insurance mechanism, but can export with an insurance mechanism (subcase 1'). More precisely, the case where the insurance policy can be called effective. In the effective case, the existence of an insurance mechanism affects the optimal decision of an exporter and makes firms more likely to export.

2.2.2. Thresholds

Recall that $c \in (0, c^u]$, where c^u is the upper bound for the unit labor cost. I assume that firm *i* draws the unit cost, *c*, from an uniform distribution. For the case where there is no insurance, c^* is a threshold cost for an exporter to accept the offer. As a result, for all $c > c^*$, it is not optimal to export for an exporter *i*. c^* is given by the following equation:[14]

$$c^* = p(\gamma + \alpha(1-\gamma)). \tag{10}$$

[14] *This result follows from equation (3).*

For the case with insurance, c_I^* is the threshold cost for an exporter to accept the offer. Hence, for all $c > c_I^*$, it is not optimal for an exporter *i* to export. c_I^* is given by the following equation:[15]

$$c_I^* = p\gamma + \alpha(1-\gamma)p + \max\left(0, \underbrace{(1-\alpha)(1-\gamma)p\theta - \lambda}_{N}\right). \quad (11)$$

Lemma. If an insurance mechanism is profitable in expected terms (i.e. $N > 0$, see equation (11)), then $c_I^* > c^*$.

Proof. It follows immediately from comparing equations (10) and (11).

There are several implications of this lemma. First, suppose that $c > c^*$ (i.e. firm rejects to export without an insurance mechanism). By the lemma, it is known that if an insurance mechanism is profitable in the expected terms (i.e. $N > 0$), then $c_I^* > c^*$. Moreover, c_I^* might be sufficiently large enough such that $c < c_I^*$ also holds. This is called the effective case, since the exporter rejects the offer without insurance but accepts it with insurance. Recall that this case corresponds to the subcase 1'. Hence, government-supported insurance mechanism affects the optimal decision of an exporter. Second, this lemma implies that with a profitable insurance mechanism (in expected terms), a firm is more likely to export compared to the case where there is no insurance. More explicitly, everything else fixed, the ex-ante probability of exporting with an insurance mechanism is greater than the ex-ante probability of exporting without an insurance system: $\frac{c_I^*}{c^u} > \frac{c^*}{c^u}$.[16]

2.3. Heterogeneous Exporters (Firms)

In this section, I move away from the representative exporter assumption. Instead, I assume that there is a continuum of exporters in country H and each exporter produces a different variety, *z*. I assume that measure of exporters in country H is fixed and equal to 1. Each firm draws a unit cost, *c*, from a publicly known uniform distribution with support $c \in (0, c^u]$. However at the beginning of the period, importer *m* does not

[15] *This result follows from equation (2).*

[16] *The ex-ante probability corresponds to the time before drawing* c.

know exporters' c.[17] A representative importer m in country F has a preference for variety. I assume that importer m values each variety equally and wants to consume only one unit of each variety, z. Consequently, at the beginning of the period, importer m makes the same offer, m, to all types of exporters.[18]

2.4. Policy Implications of Export Insurance

Proposition 1: If an insurance mechanism is profitable in expected terms, then there is a measure of firms in country H which cannot export without insurance but can export with an export insurance policy. Moreover, this additional measure of firms which are exporting only with an insurance policy is given by the following interval: $(c^*, c_I^*] \in (0, c_u]$.

Proof: In the ``no insurance" case, if firms are heterogeneous in terms of unit cost c (or productivity), then only firms with $c \leq c^*$ export, and the rest of the firms cannot export. These follow from threshold equation (10). Firms with relatively low c can make non-negative profits. In contrast, firms with relatively high c cannot make non-negative profits and therefore, they reject the offer. In the ``insurance" case, if firms are heterogeneous in terms of unit cost c, then only the firms with $c \leq c_I^*$ export, and the rest of the firms cannot export due to the above reasons. These follow from threshold equation (11). If the insurance mechanism is profitable in expected terms, lemma 1 implies that there is an additional measure of firms which accepts the offer. Moreover, $(0, c^*]$ is the measure of firms which can export with or without insurance. $(c^*, c_I^*]$ is the measure of firms which can export with an insurance mechanism but cannot export without insurance. Finally $(c_I^*, c^u]$ is the measure of firms which cannot export in either case (with or without insurance) due to high costs (low productivity).

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[17] *Note that there is a unit measure of exporters (firms) which draws* c *and I assume that the firms which have the same* c *produce the same variety,* z*. Hence, different varieties may also be represented by different costs. All varieties have the same quality, hence different unit costs can be interpreted as some firms can produce the same amount and quality less costly than the others since they are more productive.*

[18] *I assume that consumer* m *has sufficiently large enough endowments to exchange with all the varieties. If an exporter* z *rejects the offer, then this endowment is treated as savings for importers. Savings cannot be used for new offers in a period and consumed in that period. Hence an importer's endowment is equal to*

$$\underbrace{pz^*}_{\text{importer } m \text{ pays this amount to exporters}} + \underbrace{p(1-z^*)}_{\text{savings for importer } m} = \omega.$$

ω denotes the total endowment of importer m*, z^* denotes the measure of exporters who accepts the offer and exports, and $(1-z^*)$ denotes the measure of exporters who rejects the offer and does not export.*

Proposition 2: If an insurance mechanism is profitable in the expected terms, then an increase in θ, causes an increase in the measure of firms which cannot export without insurance but can export with insurance.

Proof: We know that the additional measure is $(c^*, c_I^*]$ (firms which only export with insurance). Since c^* is independent of θ and c_I^* increases in θ, an increase in θ causes an increase in the measure of firms which cannot export without insurance but can export with insurance.

One implication of proposition 2 is that the measure of exporting firms increases with a higher expected profitable insurance mechanism. This result also implies that total exports from country H to F increases with an increase in θ.

2.4.1. Which Type of Firms Are Exporting More With Insurance Policy?

In order to answer this question, I use the following observed fact (which is also supported by theoretical results): There is a positive relationship between firms' productivity (i.e. 1/unit cost) and size. For theoretical results, see Melitz (2003: 1699-1700), Melitz and Ottaviano (2008: 298-299). For empirical evidence see Van Ark and Monnikhof (1996: 6-7), Leung, Meh and Terajima (2008: 11-16) among others. Using this observed fact and proposition 1, I conclude that this policy mainly helps medium-sized firms. Note that additional measure which can export only with an insurance mechanism is $(c^*, c_I^*]$. This interval mainly corresponds to medium-sized firms. Moreover $(0, c^*)$ corresponds to the largest firms since these firms are the most productive ones. $(c_I^*, c^u]$ corresponds the smallest firms since they are the least productive ones.

Intuition behind this result is that the largest firms in the economy can take risks by themselves. For small-sized firms, it is still too risky to export to lesser-known markets even with the insurance mechanism. However, medium-sized firms cannot take the risk by themselves but can export by the help of insurance mechanism to lesser-known markets. In summary, number of exporting firms' increases with the insurance mechanism and this increase is caused mostly by medium-sized firms.

3. Numerical Example for Policy Implications

First, I analyze the case where $\theta = 0$ (i.e. no insurance case). Note that when $\theta = 0$, then $\max(0, (1-\alpha)(1-\lambda)\theta - \lambda) = 0$. I call the "no insurance" case as a benchmark case. Second, I analyze the case where $\theta = 0,5$ (i.e. model with an insurance policy) in order to compare the results with the benchmark. Finally, I analyze the effect of

an increase in coverage of insurance (i.e. $\theta = 0,6$ and cost of insurance is constant). Other parameters are chosen as follows for the numerical example: $\alpha = 0,5$, $\gamma = 0,2$, $\lambda = 0,05$, $p = 0,5$ and $c^u = 1$.

Table: 1
Measure of Exporting Firms Under 3 Different Cases

	$\theta = 0$	$\theta = 0,5$	$\theta = 0,6$
Measure of Exporting Firms	0,3	0,35	0,37

Table 1 presents the results for measure of exporting firms when $\theta = 0$, $\theta = 0,5$ and $\theta = 0,6$. When there is no insurance $\theta = 0$, measure of exporting firms is 0,3. Since the total measure of firms is 1, then 0,3 shows the ratio of exporting firms to total firms. Hence, only the most productive firms can export. However, with an insurance policy there is an additional measure of firms which can export. In this example, 0,35 is the measure of exporting firms with the insurance policy. Moreover, if there is a 10 percent increase in the coverage of insurance (keeping the cost same), then there is a 2 percentage points increase in the measure of exporting firms. Measure of exporting firms also shows the ex-ante probability (before drawing the cost) of exporting. Hence, firms are more likely to export with an insurance policy. An increase in θ also increases this probability.

Second, I analyze the case where all the importers are good type (i.e. $\alpha = 1$) and this is publicly known. This case can be interpreted as exporting to well-known and reliable markets. Table 2 presents the results when $\alpha = 1$.[19]Given $\alpha = 1$, 0,5 is the measure of exporting firms for all 3 cases. This is because there is no need for an insurance mechanism (and it is ineffective) since all the importers are good type and this is publicly known. However, only half of the firms are exporting. The other half of the firms are not productive enough to export and join the international markets. This measure cannot export even with an insurance mechanism.

Table: 2
Measure of Exporting Firms When $\alpha = 1$

	$\theta = 0$	$\theta = 0,5$	$\theta = 0,6$
Measure of Exporting Firms	0,5	0,5	0,5

[19] *Other parameters are kept same as in the previous example.*

These results imply that there are 4 different regions for firms:[20]

- $c \in (0;0,3]$ exports in either case (with or without insurance). This measure corresponds to the most productive (larger) firms.
- $c \in (0,3;0,35]$ exports only with insurance. This measure corresponds to medium sized-firms.
- $c \in (0,35;0,5]$ cannot export with the existing insurance mechanism but can export with an insurance mechanism that is more profitable in expected terms. This measure also corresponds to medium sized-firms.
- $c \in (0,5;1]$ cannot export due to low productivity (independent of insurance mechanism). This measure mostly corresponds to small-sized firms.

This results show that the government policy can affect the firms $c \in (0,3;0,5]$. This measure mostly corresponds to medium-level productivity (medium-sized) firms.

4. Conclusion

In this paper, I analyze the effect of "export insurance policy" when exporting to lesser-known markets. In a simple model where exporters do not have complete information about importers' characteristics (such as contract viability), I find that a government policy can increase the total volume of exports to lesser-known markets. More explicitly, there are some firms which cannot export to lesser-known markets due to the risk premium. This risk premium is caused by the incomplete information about lesser-known markets. However, some of the firms which could not export before the implementation of this export insurance policy can export with the support of this policy. Moreover, this policy mainly affects medium-sized firms. Hence, these firms are the ones which benefit the most from this policy. In a future work, total social welfare analysis can be done comparing the benefits of this export insurance policy and the possible government loss.

[20] *See appendix figure 3.*

Appendix

Figure: 1
Timing in a Period: No Insurance Case

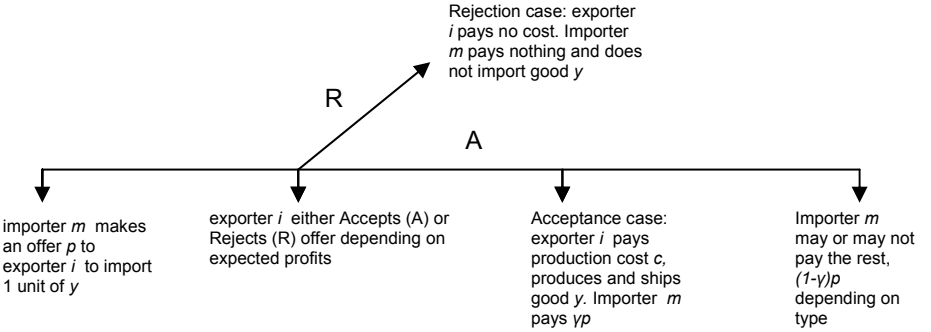


Figure: 2
Timing in a Period: Export Insurance Case

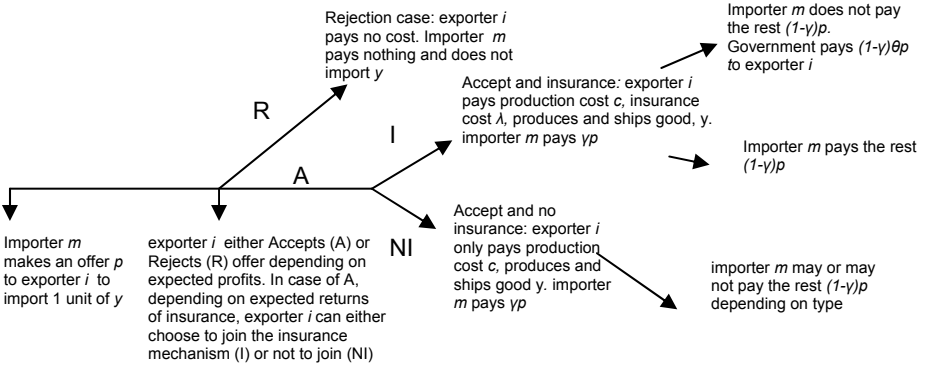
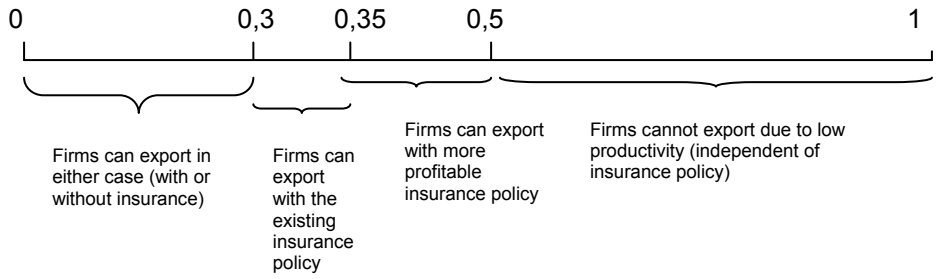


Figure: 3
Different Regions For Firms



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