CENTRE
D'ÉTUDES PROSPECTIVES
ET D'INFORMATIONS
INTERNATIONALES

No 2009 – 21
September

DOCUMENT DE TRAVAIL

Spatial Price Discrimination in International Markets

Julien MARTIN

TABLE OF CONTENTS

SPATIAL PRICE DISCRIMINATION IN INTERNATIONAL MARKETS

NON-TECHNICAL SUMMARY

This paper presents a theoretical discussion and an empirical investigation of the impact of distance on the spatial pricing policy of exporting firms.

Firms' fob prices can vary depending on the distance to the destination market for two reasons: (i) firms can charge a different markup (ii) they can offer a product with slightly different quality. In theoretical models, distance generally covers transport costs. This paper shows that the response of firms' prices to changes in distance to the destination market depends on the formulation of transport costs. Assuming additive or iceberg transport costs may imply opposite predictions concerning this relationship. Particularly, to have a positive relationship between prices and distance (because quality and/or markups increase) it is necessary to use additive transport costs. To discriminate among the two formulations, I try to measure the empirical impact of distance on prices.

The empirical analysis is based on French customs export data reporting bilateral export shipments of about 100,000 French exporters and 10,000 products for year 2005. For each flow, bilateral values and quantities are used to compute unit values. Unit values at the firm and product level are used as proxies for prices. The main empirical result is that French exporters set higher prices toward the more remote markets. This result is obtained at the firm and product level. It remains valid when controlling for size, wealth or the level of competition of the destination market.

This finding goes against the predictions of the main models of international trade predicting either a nil or a negative impact of distance on prices at the firm level. It also questions the use of iceberg transport costs. Indeed to have such positive relationship between prices and distance at the firm level, it seems necessary to introduce an additive component in the transport cost.

The empirical analysis does not allow to precisely disentangle whether the observed positive impact of distance on prices is due to higher markups or higher quality. However, some robustness checks show that the first effect is at stake.

ABSTRACT

This paper presents a theoretical discussion and an empirical investigation of the impact of distance on the spatial pricing policy of exporting firms. The theoretical part points out the importance of transport costs formulation to determine how distance impacts fob prices. Assuming additive or iceberg transport costs might imply opposite predictions concerning this relationship. The empirical analysis is based on French export data providing us with bilateral export unit values at the firm and product level. The main empirical result is that French exporters set higher prices toward the more remote markets. This finding goes against the predictions of the main models of international trade (with or without quality) predicting either a nil or a negative impact of distance on prices at the firm level. It also questions the use of iceberg transport costs. A way to reconcile theory with the data is to introduce additive transport costs.

JEL Classification: F10, F14, L11.

Keywords: Spatial price discrimination, Export prices, Distance, Firm level data

DISCRIMINATION SPATIALE EN PRIX SUR LES MARCHÉS INTERNATIONAUX

RÉSUMÉ NON TECHNIQUE

Cet article étudie théoriquement et empiriquement l'impact de la distance sur la politique de prix des firmes exportatrices.

Le prix franco-à-bord d'un bien exporté par une firme donnée peut varier selon la distance au marché de destination pour deux raisons : (i) la firme peut fixer une marge différente et (ii) la firme peut vendre un produit de qualité différente. Dans les modèles théoriques la distance représente en général les coûts de transport. Cet article montre que la réaction des prix à une augmentation de la distance au marché de destination dépend fortement de la formulation du coût de transport. Supposer des coûts additifs ou multiplicatifs (iceberg) peut en effet impliquer des prédictions opposées concernant la relation entre prix et distance au niveau de la firme. En particulier il apparaît que pour que les prix fixés par un exportateur augmentent avec la distance (suite à une augmentation de la marge ou de la qualité) il est nécessaire d'avoir des coûts de transport additifs $ie.$ supposer que le coût de transport n'est pas proportionnel au prix du bien exporté. Pour discriminer entre les différentes formulations des coûts de transport nous procédons à une investigation empirique visant à mesurer l'impact des prix sur la distance.

L'analyse empirique repose sur des données bilatérales des douanes reportant les flux d'exportations françaises de près de 100 000 exportateurs et 10 000 produits pour l'année 2005. Pour chaque flux, les valeurs et les quantités sont utilisées pour calculer les valeurs unitaires. Les prix sont approchés par les valeurs unitaires. Le principal résultat est que les exportateurs français fixent des prix plus élevés vers les destinations les plus lointaines. Ce résultat est obtenu au niveau firme et produit. Il reste valable lorsque l'on prend en compte la taille, niveau de développement, ou le niveau de concurrence sur le marché de destination.

Ce résultat empirique va à l'encontre des prédictions des principaux modèles, ces derniers prédisant une relation nulle ou négative entre prix et distance au niveau firme et produit. Il remet également en cause l'utilisation des coûts de transport iceberg. En effet, pour obtenir théoriquement une relation positive entre prix et distance il semble nécessaire d'avoir un coût de transport additif.

L'analyse empirique ne permet pas de distinguer précisément si l'augmentation des prix est due à une hausse des marges ou à une hausse de la qualité (effet Alchian-Allen). Cependant diverses analyses développées dans cet article laissent supposer que le premier effet joue un rôle non négligeable.

RÉSUMÉ COURT

Cet article étudie théoriquement et empiriquement l'impact de la distance sur la politique de prix des firmes exportatrices. La partie théorique souligne l'importance de la formulation des coûts de transport pour déterminer comment les prix franco à bord évoluent avec la distance. Supposer des coûts additifs ou multiplicatifs (iceberg) peut en effet impliquer des prédictions opposées concernant la relation entre prix et distance au niveau de la firme. L'analyse empirique repose sur des données bilatérales des douanes reportant les flux d'exportations françaises au niveau firme-produit pour l'année 2005. Le principal résultat est que les exportateurs français fixent des prix plus élevés vers les destinations les plus lointaines. Ce résultat empirique va à l'encontre des prédictions des principaux modèles, ces derniers prédisant une relation nulle ou négative entre prix et distance au niveau firme et produit. Il remet également en cause l'utilisation des coûts de transport iceberg. Un moyen simple pour obtenir théoriquement une relation positive entre prix et distance consiste à utiliser un coût de transport additif.

Classification JEL : F10, F14, L11.

Mots clés : Discrimination spatiale, prix à l'exportation, distance, données firmes

SPATIAL PRICE DISCRIMINATION IN INTERNATIONAL MARKETS[1]

Julien MARTIN *

1. INTRODUCTION

International trade is strongly affected by geographical distance as emphasized by Disdier and Head (2008). Moreover, Anderson and van Wincoop (2003) point out the importance of national borders showing that countries are segmented markets. This suggests that international markets provide a fruitful framework to think about spatial price discrimination. Actually, if markets are segmented enough, exporting firms can set different prices depending on the distance to foreign buyers.

Hoover (1937), Greenhut et al. (1985) and others have shown the optimal response of firms' prices to changes in distance to buyers depends on the form of the demand. The present paper stresses that it also depends on the formulation of transport costs. A common assumption of new trade models is that transport costs have an iceberg form, so they impact prices and other economic variables in a multiplicative way. This assumption contributes to models' *elegance* - as in Krugman (1980) or Melitz (2003). This formulation is not that obvious however. In industrial organization for instance, additive transport costs (also called per unit transport costs) are often preferred to iceberg ones. Here it is shown that using additive or iceberg transport costs implies opposite predictions concerning the impact of distance on prices. in the theoretical part, several formulae are derived for the optimal price (net of transport costs) set by firms depending on the form of preferences and the formulation of transport costs. It is first considered that firms have a constant marginal cost whatever the destination market. In that case transport costs only impact firms' mark-ups. Then follows a discussion about the impact of distance on prices when firms are able to set a different quality depending on the destination market. In both cases, the formulation of transport costs turns out to be crucial to determine how firm's prices vary with distance. The importance of the theoretical distinction between additive and iceberg transport costs is highlighted by the empirical evidence presented in this paper. Estimations are based on highly detailed firm-level data describing prices set by French exporters toward different

[1]Parts of this work were drafted when I was working at CEPII. I am grateful to Lionel Fontagné for his encouragement and advice. I am also grateful to Agnès Bénassy-Quéré, Matthieu Crozet, James Harrigan, Guy Laroque, Philippe Martin, Thierry Mayer, Isabelle Méjean, Vincent Rebeyrol, Farid Toubal, Eric Verhoogen and Soledad Zignago for helpful discussions and judicious comments. I also thank the participants of the CREST-LMA seminar, the PSE lunch seminar, the INSEE-CEPII seminar, the 2009 RIEF doctoral meetings, the 2009 EEA congress and the 2009 ETSG congress. I remain responsible for any error.

*CREST-INSEE and Paris School of Economics, Université Paris1; (julien.martin@ensae.fr)
Julien MARTIN, LMA, CREST-INSEE, 15 boulevard Gabriel Péri, 92245 Malakoff cedex, FRANCE

destination countries in 2005. The main finding is that distance has a positive impact on prices at *the firm and product level*. In other words, French exporters are likely to adopt reverse dumping strategies.[2] This result goes against predictions of nearly all models in international trade, with and without quality differentiation. The way to reconcile theoretical predictions with the data in existing models is to use an additive transport cost instead of an iceberg one.

This paper is related to different strands of the literature. The positive relationship between trade unit values and distance at *the product level* is a well established empirical fact; see Schott (2004), Hummels and Klenow (2005), Mayer and Ottaviano (2007) or Fontagné et al. (2008). Several papers contribute to explain this fact. Hummels and Skiba (2004) and Baldwin and Harrigan (2007) propose two distinct models in which the average quality at the product level increases with the distance. The former use additive transport costs whereas the latter build on iceberg transport costs and firm heterogeneity in terms of quality.[3] Since higher quality goods are also more expensive, product unit values increase with the distance. In these models, prices are different across firms but the price net of transport costs of a given good sold by a given firm is the same whatever the destination country. Compared with the literature aforementioned, the present paper focuses on price differentials of a good sold by an given firm into different markets. In other words, it deals with the relationship between prices and distance at *the firm and product level*.

Theoretically, this work relies on the long tradition of spatial price discrimination. One of the seminal contribution to this literature is due to Hoover (1937). The author shows that firm spatial pricing policy depends on the characteristics of the elasticity of demand. He already distinguishes mill pricing, dumping and reverse dumping strategies. A small part of the trade literature focuses on dumping strategies. For instance, Brander (1981) and Brander and Krugman (1983) explain trade between similar countries by reciprocal dumping.[4] Another part of the international trade literature gets rid of price discrimination to favor models' tractability. Models of the new trade literature built on the seminal work by Krugman (1980) adopt this strategy.[5] In these models, the combination of monopolistic competition, CES utility function and iceberg

[2]Reverse dumping means that firms set higher mark-ups to distant buyer. The reverse is the dumping strategy in which firms absorb part of transport costs and then set lower mark-ups to remote buyers.

[3]The first work is due to Hummels and Skiba (2004). The authors build a model in which the relative price of high quality goods decreases with the distance ensuring a higher share of high quality goods in the exports toward remote countries. Since high quality goods are also more expensive, the mean price increases with the distance. In fact, the authors model the Alchian-Allen conjecture (which states that the demand for high quality goods increases with the distance) in an international context. The second work is due to Baldwin and Harrigan (2007). The authors modify a Melitz-type model by assuming heterogeneity in terms of quality rather than in terms of productivity. In that context, only high quality firms, setting the higher prices, are able to serve remote countries. Therefore, the average price measured by the unit value increases with distance.

[4]The contributions of Ottaviano et al. (2002) and more recently Melitz and Ottaviano (2008) also emphasize dumping strategies in new trade models with quasi linear demand functions. Note that in these papers (as well as in the present paper) dumping means that the firm set a higher fob price at home than abroad, not that it sets a price below its marginal cost.

[5]Melitz (2003) type models also exhibit mill pricing strategy.

trade costs implies non-discriminatorily pricing. Note that the reverse dumping strategy has attracted little attention in the literature. Nevertheless, Greenhut et al. (1985) reaffirm the possible existence of reverse dumping i.e. a positive relation between prices and distance.[6]

From an empirical point of view, few papers investigate the impact of distance on firm pricing policies. Greenhut (1981) studies the pricing policy of West German, Japanese and US firms. He underlines that spatial pricing is a common practice for these firms. However, this work focuses on sales on the domestic market. In a recent paper, using highly disaggregated firm level data, Manova and Zhang (2009) show that Chinese exporters set higher prices toward remote countries.

The present paper contributes to the literature in three ways. First it points out the importance of transport cost formulation in theoretical predictions concerning the relationship between prices and distance at the firm level. Second, it offers empirical evidence of firm's spatial pricing behaviors using highly detailed firm level data. Specifically, it highlights that on average French exporters set higher prices toward remote countries. Last it emphasizes that (i) no standard model of international trade reproduces this feature of the data and (ii) in a framework with a constant elasticity of demand, under monopolistic competition and with or without quality differentiation, the use of additive transport costs instead of iceberg ones allows to replicate the positive relationship between prices and distance observed in the data.

The main caveat of this paper is that prices are approximated by unit values which makes difficult to know whether prices increase with distance because mark-ups increase or because quality increases.[7] However, this does not affect the main conclusions of this paper for two reasons. First, the "negative" result is not affected by this consideration: with or without quality, existing models of international trade fail to predict the observed positive relationship between price and distance at the firm-level.[8] Second, it is shown in the theoretical part that to have a positive impact of distance on mark-ups and/or on quality, it is necessary to have an additive transport cost. Therefore, the positive result - stating that additive transport costs seem more appropriated than iceberg ones to replicate this feature of the data - holds as well.

The rest of the paper is organized as follows. Next section discusses the theoretical impact of distance on firm pricing policy depending on the formulation of transport costs. Section 3 presents the data. Section 4 describes the empirical strategy and the results. Finally, Section 5 concludes.

[6] Price changes might also be the consequence of changes in terms of quality sold by the firm. This type of behavior is not a pricing but a quality policy. Two papers provide a theoretical framework to think about firms' spatial *quality* discrimination: Hallak and Sivadasan (2009) and Verhoogen (2008).

[7] Note that unit values are built at the *firm and product level*, with highly detailed categories of product (CN8, more than 10,000 products) which limits the quality composition effects. Moreover, I run several estimations trying to control for or to lessen the quality effects, and the positive relation between prices and distance remains.

[8] An exception would be a model incorporating Alchian Allen effects at the firm level. Note that such model should use additive transport costs.

2. PRICING POLICY, TRANSPORT COSTS AND DISTANCE: A THEORETICAL DISCUSSION.

Firms' prices can change with transport costs because of two different mechanisms: (1) firms can charge a different mark-up (2) they can offer a product with a slightly different quality (and with different marginal cost of production) depending on the distance to the destination market. This section first presents how firms change their markup given the transport cost formulation. Then it briefly discusses the second mechanism. Hereafter elasticities of prices to distance rather than to transport costs are derived. To do this, it is assumed that distance and transport costs are positively correlated.

2.1. Production side

This section focuses on a firm f exporting to country j. It faces a constant cost of production w_f to produce one unit of good and a transport cost.

The two types of trade frictions widely used in the literature are the iceberg one and the additive transport costs. In trade models, the iceberg formulation is the most commonly used. It has been popularized by Samuelson (1954). Answering Pigou (1952) criticism, Samuelson introduced (in a model à la Jevons-Pigou) a transport cost. Instead of modeling a transport sector, Samuelson assumes that "*as only a fraction of ice exported reaches its destination*", only a fraction of the exported good reaches its destination. Therefore, to serve x units of a good, firms have to produce τx units, with τ greater than one. Since this work, this specification has been widely used, but not much questioned in the trade literature.[9] In the industrial organization literature, the additive formulation is used.

Let me consider a mix of these two approaches:

$$p_{fj}^{cif} = \tau_{fj}^{ij} p_{fj}^{fob} + f_{fj} \tag{1}$$

where p^{fob} is the fob price, p^{cif} is the price faced by the consumer and f and τ are the additive and multiplicative components of the transport cost. If f is nil then the transport cost has an iceberg form whereas if τ is one, then it is an additive transport cost.[10] This formulation is

[9] Nevertheless one can mention the words of Bottazzi and Ottaviano (1996) "*we wonder whether the passive devotion to the iceberg approach is covering some of the most relevant issues that arise when trying to think realistically about the liberalization of world trade*". This sounds as a clear will to discuss this modeling. Another criticism is done by McCann (2005). The author argues that the main problem with the trade cost appears when the geographical distance is related to it. Last, Hummels and Skiba (2004) show that transport costs do not react proportionally to a change in prices which empirically rejects the iceberg trade costs.

[10] The main problem with the iceberg formulation formulation is that every change in the fob price of the shipped good is passed on to the value of the trade cost. This means that the level of trade cost is proportional to the fob price. Actually, measuring the transport cost as the difference between the cif price and the fob price, one gets: $p_{cif} - p_{fob} = (\tau_{ij} - 1)p_{fob}$. Note that here τ cannot be interpreted as an exchange rate or a tariff. Actually, τ is applied to the fob price whereas both tariff and exchange rates are applied to the cif price.

still highly restrictive, but it allows us to highlight the different predictions one can get when modifying τ and f. [11]

The firm's strategy in a given market are supposed to be independent from its strategy in other markets. In market j, the firm faces a mixed transport cost (see Equation 1) and maximizes the following operational profit:

$$\pi_{if} = \left[p_{fj}^{fob} - w_f\right] q_{fj} = \left[(p_{fj}^{cif} - f_{fj})/\tau_{fj} - w\right] q_{fj} \tag{2}$$

where q_{fj} is the quantity sold on market j (that depends on the cif price). The first order condition with respect to consumer price yields:

$$p_{fj}^{cif} = \frac{\epsilon_j^{cif}}{\epsilon_j^{cif} - 1}[f_{fj} + w_f \tau_{fj}] \quad or \quad p_{fj}^{fob} = \frac{1}{\epsilon_j^{cif} - 1}\frac{f_{fj}}{\tau_{fj}} + \frac{\epsilon_j^{cif}}{\epsilon_j^{cif} - 1} w_f \tag{3}$$

where ϵ_j^{cif} is the elasticity of demand to the cif price faced by firm f in market j. Hence, the optimal fob price set by a firm is a function of (i) transport costs , (ii) the marginal cost of production, (iii) the elasticity of demand to the (cif) price.

The elasticity of the optimal fob price to distance writes:

$$\frac{\partial log(p^{fob})}{\partial log(dist)} = \left[\frac{\partial log(f)}{\partial log(dist)} - \frac{\partial log(\tau)}{\partial log(dist)}\right] / \left[1 + \frac{\tau}{f}\epsilon w\right] - \left(\frac{\partial log(\epsilon)}{\partial log(dist)}\right)\left(\frac{\epsilon}{\epsilon - 1}\right)\left(\frac{\frac{f}{\tau} + w}{\frac{f}{\tau} + \epsilon w}\right) \tag{4}$$

The sign of this elasticity depends on τ and f $i.e.$ on the formulation of transport costs, but also on the the elasticity of the price elasticity of demand to distance.

Let me first consider cases where the demand elasticity does not depend on distance (i.e the second term on the right hand side is nil). [12] Assuming that the elasticity can depend on the cif price and another term a such as country size, or consumer tastes. Therefore, the second term is nil if:

$$\frac{\partial \epsilon}{\partial dist} \frac{\partial \epsilon(p_{cif}, a)}{\partial p_{cif}} * \frac{\partial p_{cif}}{\partial dist} + \frac{\partial \epsilon(p_{cif}, a)}{\partial a}\frac{\partial a}{\partial dist} = 0 \tag{5}$$

where a is a parameter described above. This equality is verified if both $\frac{\partial \epsilon(p_{cif},a)}{\partial p_{cif}}$ and $\frac{\partial a}{\partial dist}$ are nil. That is verified in specific models such as CES or ideal variety models. It means that the

[11] This transport cost is similar to that used by Hummels and Skiba (2004) but here I assume that both the ad-valorem and the additive parts increase with distance. This allows me to study special cases where distance impacts transport costs only through τ or only through f.

[12] In linear demand model, this is not true since the elasticity depends on the cif price which is itself a function of distance. Nevertheless, models with non constant elasticity can be independent on distance. For instance the ideal variety model of Lancaster (1979) draws elasticities which are negatively linked to the size of the country. In that context, higher transport costs do not impact the elasticity of demand to prices.

price elasticity is considered as exogenous from the firm viewpoint. In this first case, distance does not impact variables (other than the price) in the price elasticity of demand. This means that distance enters in the model only through transport costs.[13]

> **Theoretical fact 1:** *When the elasticity of demand to cif price is "exogenous" and distance does not impact this elasticity, the spatial price policy adopted by the firm is entirely determined by the formulation of transport costs.*

In this first case, looking at Equation (4), if f is nil and a does not vary with distance, the firm adopts either a dumping strategy or a mill pricing strategy. This motivates the second fact:

> **Theoretical fact 2:** *"Pure" iceberg transport cost does not allow to generate reverse dumping strategies under standard forms of demand and competition.*

Nevertheless one could imagine that tastes of consumers depend on the distance from the supplier for instance hence that the elasticty of demand depends on distance. This type of assumption would be ad-hoc and we do not know in which way it could play. [14] Another, possibility is that competition is softer in remote markets. This is counter-intuitive but in that case, one could observe a lower elasticity of demand in these remote countries and thus higher prices. [15]

The next section derives the elasticity of demand to prices for general forms of preferences.

2.2. Specifying the form of preferences

Let us consider the following inverse demand faced by firms:

$$p^{cif} = z - kq^{\theta} \tag{6}$$

where z, k and θ are parameters. The analysis focuses on the case without strategic interactions: firms are in monopolistic competition. Therefore firms do not take into account their impact on the price index when maximizing their profits. The price index can be either in the constant z or in the shape parameter k. The associated elasticity of demand to price is given by:

$$\epsilon^{cif} = -\frac{\partial log(q)}{\partial log(p_{cif})} = \frac{p_{cif}}{\theta(z - p_{cif})} \tag{7}$$

First, consider the case where z and k are positive parameters and θ is equal to one. In this case the inverse demand corresponds to the quasi linear demand model developed by Ottaviano et al.

[13]Note that the fact that distance impacts theoretical models only through transport costs is common in trade models. Mellon (1959) states that "*international trade theory explicitly introduces distance in the form of transport costs - $i.e.$ via the price mechanism*".

[14] However, cultural proximity is closely linked with geographical distance. Therefore, if the demand is higher in closer markets one should observe a negative link between prices and distance.

[15]However, if competition is actually softer, firms should also exhibit higher sales in volumes or at least in value in these markets. It is not the case in the data. Actually, as shown in Table C.5 and C.6 in Appendix, at the firm and product level, both values and quantities decrease with distance.

(2002) and recently used by Melitz and Ottaviano (2008). This type of demand is characterized by a positive impact of prices on the price elasticity of demand.

By contrast, if z is nil and k and θ are negative, the inverse demand function corresponds to a CES utility function in monopolistic competition - see Krugman (1980) or Melitz (2003). In that case, ϵ^{cif} is a constant equal to $-1/\theta$. Computing the elasticity of prices to distance yields:

$$\frac{\partial log(p_{fob})}{\partial log(dist)} = \frac{\theta}{\theta+1}\left(-\frac{f}{\tau}\frac{\partial log(f)}{\partial log(dist)} - (\frac{z}{\tau} - \frac{f}{\tau})\frac{\partial log(\tau)}{\partial log(dist)}\right)/p_{fob} \quad (8)$$

This equation shows that the sign of the price elasticity to distance depends both on demand parameters (z, k and θ) and on transport costs formulation ($i.e.$ f and τ).

Elasticities for the generalized quadratic utility function and the CES utility function both in a monopolistic competition context are easily computed. The sign of these elasticities are presented in Table 1. The first row presents the quadratic case, the second the CES case and the third describes the general case, when the form of the demand is not specified but the elasticity only depends on price.[16]

Table 1: Elasticity of fob price to distance

Demand	Parameters	fob Price	Transport Cost	$\frac{\delta log(p)}{\delta log(dist)}$
(1) Quadratic	$z >$ f ≥ 0 $k > 0$ θ>0	$p_{fob} = \frac{\theta}{\theta+1}(\frac{z}{\tau} - \frac{f}{\tau}) + \frac{w}{\theta+1}$	τ=1 f=0 $f \neq 0, \tau \neq 1$	- - -
(2) CES	$z = 0$ $k > 0$ $\theta = \frac{-1}{\sigma}, \sigma > 0$	$p_{fob} = \frac{1}{\sigma-1}(\frac{f}{\tau}) + \frac{\sigma}{\sigma-1}w$	τ=1 f = 0 $f \neq 0, \tau \neq 1$	+ 0 ?
(3) Unspecified	$\frac{\partial\epsilon(p,a)}{\partial p} \geq 0$ $\frac{\partial a}{\partial dist} = 0$	$p_{fob} = \frac{1}{\epsilon-1}(\frac{f}{\tau}) + \frac{\epsilon}{\epsilon-1}w$	τ=0 f=1 $f \neq 0, \tau \neq 1$	- / 0 / + 0/- ?

Case (1) shows that for quasi linear demand models, in monopolistic competition, for the different formulations of transport costs, the distance has a negative impact on fob prices.

> **Theoretical fact 3**: *Under quasi-linear demand, firms reduce their mark-ups to sell goods in more distant countries, whatever the formulation of transport costs.*

[16]Table (1) displays the fob prices for the two cases aforementioned and for three types of transport costs: iceberg, additive and mixed transport costs. To derive these elasticities, I assume that τ and f are two differentiable and increasing function of distance. In case (1) I also assume that z is greater than f to have a positive price (and therefore a positive production). In case (2), to fix ideas, θ is denoted $-1/\sigma$.

Case (2) shows that in CES models and monopolistic competition, the type of spatial price discrimination depends on the formulation of transport costs. With iceberg transport costs (f nil), price is a constant mark-up over marginal cost: firms adopt a mill pricing policy.

Theoretical fact 4: *Under monopolistic competition, in CES models, with iceberg transport costs, firms set the same mark-up whatever the distance to the destination country.*

In CES demand, under monopolistic competition, the elasticity of demand is constant so it is does not depend on the distance through prices or other parameters. Hence, Fact 4 is a special case of Fact 2.

Adding an additive part in the transport cost allows us to have non constant mark-ups. With a pure additive transport cost the price increases with distance.

Theoretical fact 5: *Under monopolistic competition, in CES models, with additive transport costs, firms set higher mark-ups toward more distant countries.*

If τ increases faster than f with distance, firms adopt a dumping strategy. The magnitude of elasticity to distance is given by the ratio $\frac{\tau}{f}$. The higher is f, the higher is the impact of this term. By contrast, if f is close to zero, this term tends to zero.

2.3. Different Qualities

This section studies the possibility for firms to sold different levels of quality of their good on the different destination markets. The formulation of transport cost is important to determine the relationship between quality and distance in that case as well.

The main model linking trade prices, quality and distance is due to Hummels and Skiba (2004). Their paper models the Alchian Allen effect at the product level but the model would remain valid at the firm and product level. The framework would be the following. First, firms face CES type demand. Second firms compete in perfect competition. Third, each firm produces two qualities of a given good. With additive transport costs, the relative cif price of the high quality (more expensive) variety of the good decreases with distance. Consequently, in remote market, the firm faces a higher demand for the high quality version of its good. At the firm and product level, the share of goods of higher quality increases with distance. Thus, the average price of the good increases with the distance. Here the positive relationship between prices and distance is due to the additive transport costs which allows the relative cif price of the high quality good to decrease with distance. In this model, this is a pure demand effect.

Existing models - where the quality is explicitly destination specific - assume either iceberg trade costs or no trade costs at all. Hallak and Sivadasan (2009) use a CES model with endogeneous choice of quality and iceberg trade costs. In that context firms decrease their quality with distance. In Verhoogen (2008), demand has a logit form and there is not transport cost. Adding an iceberg one leads to a similar conclusion: higher trade costs decrease the quality offered by the firm. Actually, in this model, an increase in τ increases the relative price of the good which reduces the demand and finally the offered quality. In the two previous models, quality is expected to decrease with transport cost. Consequently, prices also decrease with distance. In a variant of the Hallak and Sivadasan (2009) model, adding an additive part in the transport costs allows to get a positive relationship between the quality (and the price) of the good and the distance.[17]

This brief review of the three models leads to the following proposition:

> **Theoretical fact 6:** *In CES models allowing for different qualities, with additive transport costs, firms sell higher quality (more expensive) products toward distant markets.*

2.4. Discussion

The facts presented above are driven by a single key variable: the elasticity of demand. The introduction of an additive cost changes the results concerning the relationship between prices and distance because it introduces a disconnection between the elasticity of demand to the cif price and the elasticity of demand to the fob price. Actually, assuming that the transport cost has both an additive and a multiplicative component, it is easy to show that the elasticities of demand to cif and fob prices are linked by the following equation.

$$\epsilon^{fob} = \epsilon^{cif}/(1 + \frac{f}{\tau p_{fob}}) \tag{9}$$

where $\epsilon^m = \frac{\partial log(demand)}{\partial log(p_m)}$ with $m \in (cif, fob)$. In the case of pure iceberg transport cost, f is nil and the elasticities of demand to fob and cif prices are the same. By contrast, for a given elasticity of demand to the cif price, the elasticity of demand to fob price decreases in f. This allows firms remote from the market to set a relatively higher fob price. All else equal, with an additive transport cost, the demand is less responsive to changes in prices. Therefore, remote firms are able to set higher fob prices, this allows them to compensate a part of the loss due to the lower demande they face because of freight costs.

The last discussion assumes that distance impact the fob price only through f. However, in a lot of models such as quasi linear demand models, the elasticity negatively depends on cif price. Consequently whit additive transport costs, two opposite forces are at stake. The elasticity of demand to fob price tends to decline due to the additive cost, but it also increases because the cif price increases due to higher transport costs. In linear demand models, the price effect dominates, therefore the elasticity increases with transport costs and distance and prices decrease with distance.

To sum up, opposite theoretical predictions about firm spatial pricing policies apply in trade literature. The rest of the paper intends to empirically evaluate exporters' spatial pricing policies and infer theoretical conclusions from these results. The empirical analysis relies on highly detailed firm level data about French exports. Next section describes these data.

[17] See the formal derivation in Appendix.

3. DATA

The empirical analysis in this paper is based on French customs database. The database covers bilateral shipments of firms located in France in 2005. Data are disaggregated by firm and product at the 8-digit level of the the Combined Nomenclature (CN8). The raw data cover 102,745 firms and 13,507 products for a total exported value of 3.5 hundred billions euro. Since this paper deals with firm price discrimination, I only consider products sold by a firm on at least two markets. This restriction reduces the number of observations. Actually, only 45 % of firms (46,343) export toward several destinations. However, these multi-destination exporters realize more than 91% of French exports (in value). French exports toward Belgium are a potential pitfall of the data. Actually, Belgium is known as being a place of re-exports in Europe. So prices set toward Belgium also reflect prices toward more distant foreign country. To address this problem, a double check of the results is done by running regressions on a sample without Belgium. This does not change the results.[18] For each flow, the fob value and the shipped quantity (in kg) are reported. A flow is described by a firm number, a product number (CN8), and a destination country.

In the empirical part of this paper, prices are approximated by unit values. Values are declared free-on-board. Therefore, unit values are also free-on-board. The unit value set by firm f for product k exported toward country j is:

$$UV_{fjk} = \frac{V_{fjk}}{Q_{fjk}} \tag{10}$$

where V_{fjk} and Q_{fjk} are value and quantity of good k exported by firm f to country j. Unit values are well known to be a noisy measure of prices. The main criticism was formulated by Kravis and Lipsey (1974). The authors state that unit values do not take into account quality differences among products.[19]The high level of disaggregation of the data and their firm dimension limits the main drawback of unit values $i.e.$ the composition effect and more particularly the quality mixed effect. Actually with more than 10,000 products, the possibility to have goods with highly different characteristics within these unit values is limited.

Despite the quality of the data, there are some errors in declarations or in reporting. To deal with outliers, observations where unit value is 10 time larger or lower than the median unit value set by the firm on its different markets are dropped. This procedure keeps 87% of total exports remains.

The other variable of interest, for this paper, is distance. I use the dataset developed by Mayer and Zignago (2006). [20]

[18]Results are available upon request.
[19]For a recent criticism of unit values see Silver (2007).
[20]The idea is to take into account the distribution of the population within countries. Therefore, instead of computing the distance between two towns of the two countries, the bilateral distances between several towns of each

Real GDP and GDP per capita in PPP, from the IMF database, are used as control variables. I also use average imported unit values by country. These unit values are computed from BACI, the database of international trade at the product level developed by Gaulier and Zignago (2008).[21] For each hs6 product and country, average unit value weighted by the quantities are computed. For product k in country j :

$$UV(kj) = \sum w_{ijk} UV_{ijk} \tag{11}$$

where UV_{ijk} is the unit value of the good k imported from country i to country j.[22] And w_{ijk} is the weight of good k exports from country i. Then these hs6 unit values are merged with customs data. Thus for each product exported from a French firm I have the corresponding average unit value in each potential destination market. I do not have the data for 2005. Therefore, regressions with average unit values use firm level unit values and product level unit values for year 2004.

Let me turn to a short description of the French exports. Figure 1 plots the exported values from France to its main partners. A visual inspection shows the importance of Germany as a partner. Other partners are the major European countries, the two other members of the triad (USA and Japan), China but also Algeria and Morocco. Figure 2 presents the distance between France and its main partners. One can sort the countries in two groups: the close countries mainly European, and distant of less than 2,000 km. The remote but attractive countries such as the USA, China or Japan, really far away from France (more than 7,000 km), but attractive in terms of demand.

4. Estimations

4.1. Econometric strategy

The empirical question is the following: How do fob prices set by a given firm for a given product vary with distance to the foreign buyers? The theoretical discussion is oriented around the sign of the elasticity of fob prices to distance. An approximation of this elasticity is given by the regression of the logarithm of prices over the logarithm of distance. The relationship between both variables is not supposed to be linear, but in the theoretical cases developed above the relation is always monotonous. Therefore I focus on the sign of this elasticity.

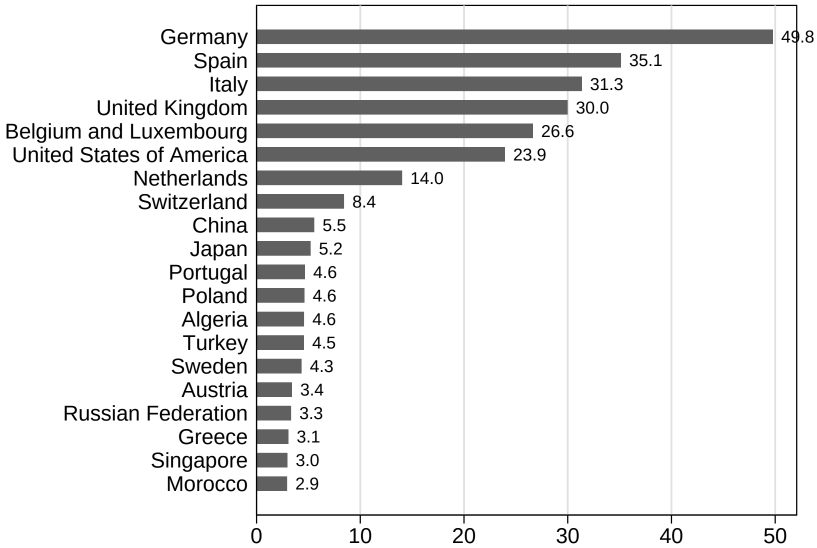
There is a possible correlation between price and distance that should be controlled for. According to Melitz (2003), more remote markets are served by the more productive firms which also set the lower price, thus there is a possible negative correlation between average prices

country are computed, and then aggregated weighting the distances by the population of each city. Data are available on CEPII's website: $http://www.cepii.fr/anglaisgraph/bdd/distances.htm$.

[21] For a description of the database, see $http://www.cepii.fr/anglaisgraph/bdd/baci.htm$.

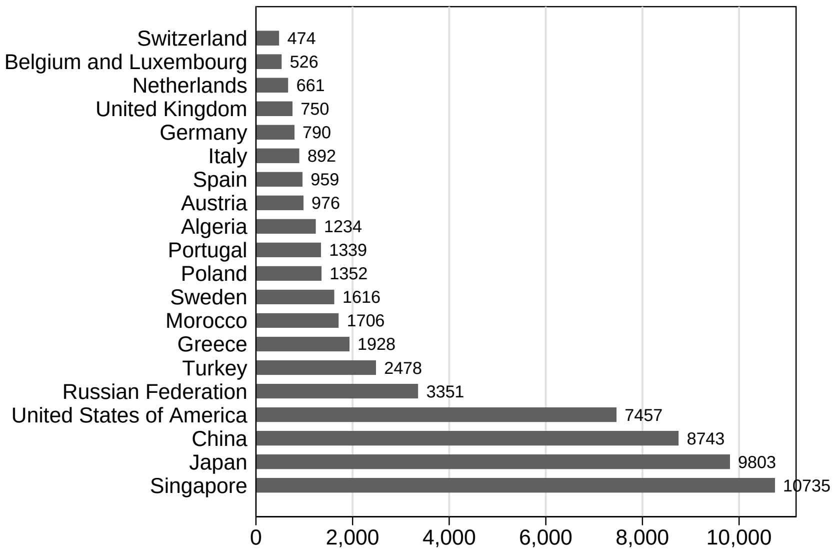
[22] BACI unit values are in USD whereas firm-level export prices are in Euro. This is not a problem, nominal exchange rate is in the constant.

Figure 1: Top 20 French trade partners



Value of exports, in billions of euro, in 2005.
Source: French custom data, author computation.

Figure 2: Distance from the main trade partners



Distance in kilometers, computed as the population weighted average of the distance between cities.
Source: CEPII.

and distance. The sign of correlation is not obvious however. In Baldwin and Harrigan (2007), only the firms producing high quality will export toward remote markets, thus average prices are positively related to distance. The two former stories deal with selection effect. Firm and product fixed effects are introduced in regressions to correct for this bias. In a first step, the following basic equation is estimated to evaluate the impact of distance on fob prices:

$$log(UV_{fkj}) = \alpha log(dist_j) + FE_{fk} + \epsilon_{fkj} \tag{12}$$

where UV is the unit value computed at the firm and product level, $dist$ is the distance between France and partner j, FE_{fk} is a firm and product fixed effect, and ϵ is the error term. Three different samples of countries are used to test the robustness of the results: all the countries, the OECD countries and the euro members. The OECD sample allows comparing prices toward countries with similar levels of development. Focusing on euro members is a way to get rid of the firm price discrimination due to (i) incomplete exchange rate pass-through and (ii) country specific tariffs.

The potential biases related to linear regression obviously matter in our case. Regressions of the log of prices on dummies for different intervals of distance are run to tackle this problem. With firm×product fixed effects, interval coefficients yield average prices set by each firm according to the distance interval. This method is used by Baldwin and Harrigan (2007) or Eaton and Kortum (2002) among others. The estimated equation is:

$$log(UV_{fkj}) = \beta D[1, 1500] + \gamma D[1500, 3000] + \eta D[3000, 6000] + \nu D[6000, ...] + FE_{fk} + \epsilon_{fkj} \tag{13}$$

where $D[a, b]$ is a dummy equal to one for distances greater than a and smaller than b.

A last method to take into account the possible non linearity of the price distance relationship is to proceed in a two step regression. In a first step, the log of price is regressed on country dummies and on product and firm fixed effects.

$$log(UV_{fkj}) = C + \sum_j \alpha_j D_j + FE_{fk} + \epsilon_{fkj} \tag{14}$$

Then dummy coefficients are regressed on the log of distance and control variable using a simple OLS.

$$\hat{\alpha}_j = C + \beta log(dist_j) + controls_j + \epsilon_j \tag{15}$$

Country dummies capture the average deviation of price from the mean price (for each firm and product). The second step measures the impact of distance on this average deviation.

The main problem of the previous regressions is the omitted variable bias. Which variables can bias our estimations? Part of the literature emphasizes the impact of the size and the wealth of the country on bilateral unit values. Baldwin and Harrigan (2007) use these controls and Hummels and Lugovskyy (2009) bring theoretical foundations to these explanatory variables in a generalized model of ideal variety. GDP and GDP per capita are used to control for these effects. The expected signs are the following. In large countries, competition is tougher which should reduce prices. By contrast, wealthy countries are expected to have a higher willingness to pay which should contribute to higher prices. One can also interpret the GDP per capita coefficient with respect to the cost. If the additive cost includes a distribution cost paid in the destination country, then the additive cost is expected to increase with the wealth of the country, because wages are higher there for instance.[23]

Models with quadratic utility functions suggest that prices depend on the average price on the market. Average unit values of imported products for the different countries are introduced in regressions to control for this. Average unit values are interesting since they take into account a lot of information on the country such as the level of competition into the market or the specificity of demand. Both GDP per capita and mean unit value help to control for the possible unobserved heterogeneity in terms of quality exported by the firm toward the different destinations.

In all these regressions I am interested in the significance of estimated coefficients. Actually, the CES model with iceberg trade costs predicts that the elasticity of price to distance is nil. Therefore, estimation of the standard error is important. In the regressions concerning the pooled sample, part of the heteroscedasticity is captured by the fixed effects. However, with such a great number of observations, the variance can be biased by the correlation within groups of observations. To limit the bias in the estimated standard errors, I use a clustering procedure at the country level. However this clustering procedure assumes a large number of clusters whereas in our dataset the number of clusters (number of countries) is rather small compared to the number of observations. This point was raised by Harrigan (2005) (see Wooldridge (2005) for a technical discussion). In Appendix, Table B.1 and B.2 present some of the results when using the alternative methodology proposed by Harrigan. The methodology consists in a two way error component model. The basic idea is to introduce both firm$\times$ product fixed effects and country random effects. Since one cannot run such regression, one first "removes the firm and product means from all variables and then runs the random effects regressions on the transformed variables" as indicated in Harrigan (2005).

4.2. Results

This section presents empirical finding concerning the relationship between prices and distance at the firm level. Results unambiguously suggest that distance has a positive impact on prices. Table 2 presents basic regressions of the logarithm of the price on the logarithm of distance. Columns (1) to (3) of Table 2 display results of the estimation of Equation (12). Columns (4) to (6) present the results with wealth and size controls. In all the regressions, the estimated elasticity of prices to distance is positive and almost always significant. In column (1), the sample contains all destination markets of French exporters. The estimated elasticity is 0.044. If

[23]See Corsetti and Dedola (2005).

the distance doubles, the average exporter increases its fob price by 3% $(2^{0.044}-1)$. Focusing on the OECD sample (Column 2), one observes that the elasticity is larger than the last estimation. The estimated elasticity reaches 0.48. Column (3) focuses on the euro sample. This sample is interesting because the pricing to market in the euro area cannot be due to incomplete exchange rate pass-through, and their are no country specific tariffs for French goods. The elasticity is 0.005 and not significant. However, this might be the consequence of an omitted variable

Table 2: Prices and distance at the firm level

Dependent variable	Price (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
Distance (log)	0.044^a	0.048^b	0.005	0.054^a	0.056^a	0.015^c
	(0.013)	(0.019)	(0.005)	(0.011)	(0.015)	(0.007)
GDP (log)				0.001	0.003	0.003
				(0.004)	(0.007)	(0.002)
GDPc (log)				0.020^a	0.052^b	0.022^c
				(0.007)	(0.019)	(0.011)
Constant	2.611^a	2.546^a	2.638^a	2.337^a	1.930^a	2.329^a
	(0.100)	(0.135)	(0.036)	(0.093)	(0.171)	(0.144)
Fixed effects	Firm × Product					
Sample	All	OECD	Eurozone	All	OECD	Eurozone
Observations	2035072	1487782	920671	2035072	1487782	920671
R^2	0.003	0.004	0.000	0.004	0.006	0.000
rho	0.925	0.935	0.938	0.925	0.935	0.938

Clustered standard errors in parentheses
^{c} p<0.1, ^{b} p<0.05, ^{a} p<0.01

bias. Markets' characteristics could be correlated with distance from France (France is close to the wealthy markets for instance). In columns (4-6) I control for market characteristics by introducing the size (GDP) and the wealth (GDP per capita) of the destination country. One can see that the size of the country has no significant impact on prices whereas wealth has a positive impact. The distance coefficient is positive, significant and even higher than without controls. This is particularly true for the Eurozone, where the distance elasticity is 3 times higher and becomes significant (column (3) vs column (6)). The point is that within Eurozone, the closest countries from France are also the countries with the highest GDP per capita which as a strong positive impact on the fob price. Therefore, French firms face two opposite forces when exporting toward euro countries. On the one hand, they set higher prices toward remote countries due to transport costs. On the other hand, firms set high prices toward wealthy (and close from France) markets. This is why the coefficient on distance is higher when controlling for GDP per capita. As a robustness check, Table B.1 in Appendix presents the results obtained when applying the two step methodology developed by Harrigan (2005). The coefficients are still positive and significant and even higher.

Why are fob prices higher toward high GDP per capita countries? The standard explanation is that consumers with high GDP per capita have a higher willingness to pay. Nevertheless, in the standard model of Lancaster (1979), there is only a size effect. In that context how to interpret the positive relationship between GDP per capita and prices? One can assume that part of the additive transport cost is paid in the foreign market (distribution cost, shipping cost between the airport or the port and the customers etc...). Therefore, the costs will partially depend on the delivery cost in the destination country which are higher in wealthy countries where wages are high. The other possible explanation would be a quality effect: wealthier countries being more likely to import high quality products.

GDP and GDP per capita are two raw measures of market specificities. Consequently, the average unit value in destination market, computed at the 6 digit product level is introduced as an additional control. The average unit value takes into account the competition on the market. Relative high unit value on a market means that the demand for this good in that market is high or that the competition is soft. Consequently, firms are more likely to set higher prices. Table 3, columns (1) to (6) present the results once the mean unit value is used as control.[24] As expected, the mean unit value coefficient is positive (even though it is not significant for Eurozone sample regressions). However, even with this control, the distance coefficient remains positive and significant.

Table 4 presents regressions on distance intervals dummies (Equation 13). Since the dummies are collinear with the constant (or the fixed effects), the first interval is dropped. For the reasons mentioned formerly, I add a firm and product specific fixed effect. To have enough information in each interval, regressions are run on the entire sample of countries. Coefficients associated with the intervals give the gap between the price set for destinations within this interval and the average price set by the firm toward all destinations. In Table 4, column (1), coefficients are greater and greater with the intervals showing that prices increase with the distance at the firm and product level. All the coefficients suggest that prices increase with the distance. The only point is that this increase is not always significant toward countries closer 1,500 km and countries ranging between 1,500 and 3,000 kilometers. In Table 4, column (3), other control variable are introduced like contiguity, a dummy if the country is landlocked or a dummy for euro countries and another for OECD countries. For small distance intervals, coefficients turn significant with the introduction of these control variables. In the three regressions, an F-test allows me to reject the equality of distance intervals' coefficients. In Appendix, Table B.2 presents the results when introducing country random effects instead of clustering at the country level. Coefficient

[24] In Appendix, Table B.3 presents benchmark regressions. They allow to show that coefficients estimated on this sample are close from the one presented in Table (2). As described in Section 3, data constrain me to provide results for year 2004 when I control for the mean unit value.

Table 3: Prices and distance, controlling for the average price on the market

Dep. variable	Price (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
Distance (log)	0.041^a	0.043^b	0.009	0.049^a	0.050^a	0.017^b
	(0.013)	(0.019)	(0.006)	(0.012)	(0.015)	(0.007)
Mean unit value (log)	0.024^a	0.015^c	0.001	0.022^a	0.012^b	0.002
	(0.006)	(0.008)	(0.003)	(0.005)	(0.006)	(0.003)
GDP (log)				-0.001	0.000	0.001
				(0.004)	(0.007)	(0.002)
GDPc (log)				0.017^a	0.049^b	0.021^c
				(0.006)	(0.018)	(0.011)
Fixed effects	Firm × Product					
Sample	All	OECD	Eurozone	All	OECD	Eurozone
Observations	1768003	1281369	778047	1768003	1281369	778047
R^2	0.004	0.004	0.000	0.005	0.005	0.000
rho	0.921	0.932	0.937	0.921	0.932	0.937

Clustered standard errors in parentheses

^{c} p<0.1, ^{b} p<0.05, ^{a} p<0.01

Year 2004

Table 4: Prices and distance intervals at the firm level

Dep. variable		Price (log)	
	(1)	(2)	(3)
1500< distance <3000	0.018	0.026	0.039[b]
	(0.013)	(0.017)	(0.018)
3000< distance <6000	0.086[a]	0.118[a]	0.119[a]
	(0.019)	(0.017)	(0.021)
6000< distance < 12000	0.129[a]	0.150[a]	0.148[a]
	(0.024)	(0.019)	(0.022)
12000< distance	0.171[a]	0.167[a]	0.182[a]
	(0.019)	(0.021)	(0.024)
GDP (log)		-0.001	0.006
		(0.004)	(0.005)
GDPc (log)		0.022[a]	0.023[a]
		(0.007)	(0.005)
1 if euro-country			-0.036[b]
			(0.017)
1 for OECD			-0.017
			(0.018)
1 for contiguity			0.017
			(0.015)
1 for common language			0.012
			(0.013)
1 if landlocked			0.042[c]
			(0.023)
Constant	2.901[a]	2.686[a]	2.650[a]
	(0.009)	(0.052)	(0.047)
Fixed effects		Firm × Product	
Sample	All	All	All
Observations	2035072	2035072	2035072
R^2	0.005	0.006	0.007
rho	0.925	0.925	0.925

Clustered standard errors in parentheses

[c] p<0.1, [b] p<0.05, [a] p<0.01

are still significant and increasing with the distance which conforts the previous results.

In the different regressions restricting the sample to euro countries, one sees that coefficients on distance are not significant or weakly significant. Two points can explain it. First the variance of distance between euro countries is really weak. It might be that for small distances, the correlation between transport costs and distance is not that good. The second point is that firms, to price discriminate, need segmented markets. Yet the European integration process and the adoption of the euro has greatly lessen the segmentation of euro markets which can contribute to explain why the coefficient is not always significant.[25]

Last, Table 5 gives the results of the two-steps estimation. As detailed in the previous section, the log of prices is first regressed on country dummies and firm and product fixed effect. Second, estimated coefficients for country dummies are regressed on distance and other country characteristics. In the second step, there are as many observations as countries. For the euro

Table 5: Second step

Dependent variable:	1^{st} step estimates			
	(1)	(2)	(3)	(4)
Distance (log)	0.058^a	0.070^a	0.013	0.057^a
	(0.008)	(0.011)	(0.008)	(0.008)
GDP (log)	-0.003	-0.002	0.000	-0.003
	(0.003)	(0.008)	(0.003)	(0.003)
GDPc (log)	0.019^a	0.058^a	0.022^c	0.019^a
	(0.004)	(0.018)	(0.011)	(0.004)
Constant	-0.533^a	-1.039^a	-0.318^c	-0.516^a
	(0.082)	(0.204)	(0.146)	(0.082)
Fixed effects	NO			
Sample	All	OECD	Eurozone	All but Japan
Observations	174	28	9	173
R^2	0.269	0.669	0.547	0.260

Clustered *t* statistics in parentheses

^{c} p<0.1, ^{b} p<0.05, ^{a} p<0.01

sample there are only 10 observations (since Belgium and Luxembourg are merged in the data). The positive sign on distance means that countries which experience a higher price (at the firm and product level) are also the more remote countries. Looking at the coefficient on dummies,

[25]The price discrimination of French exporters has actually decreased because of European integration as shown by Méjean and Schwellnus (2009).

one observes that prices are dramatically high toward Japan. This can be explained by a lot of other factors than distance such as the taste of Japanese for French products. The last column of the table proposes a regression where Japan is excluded. This does not change the sign neither the magnitude of the distance coefficient.

Estimations let me think that French exporters increase their fob prices with distance. This result is highly surprising since this policy is not the textbook case of spatial price discrimination. Note that the regressions over a sample restricted to manufacturing goods provides highly similar estimations.[26]

4.3. Discussion: Price or Quality Policy?

The main empirical result of this paper, is that unit values set by French exporters increase with distance. The theoretical part of this paper propose two explanation for this positive correlation. Either firms increase their markups toward remote countries or they increase the quality of the good they serve on these remote markets. Theoretically, both markup and quality are expected to increase in the presence of additive transport costs.

The majority of regressions control for GDP per capita and mean unit value. These controls should capture a part of the heterogeneity in terms of quality for firms exporting a different quality depending on the destination market.

As a robustness check I run regressions over a sample of monoproduct firms. The idea behind this robustness test is the following. Firms might export 10,000 products of the CN8 nomenclature. It is reasonable to think that a firm producing and selling only one CN8 product is not able to produce a different quality of this product for each destination market. In the data 42% of French firms export one single $CN8$ product.[27] Table B.4 displays the results for the sample of monoproduct firms. Results confirm the positive relationship between prices and distance. Assuming that these firms are not likely to propose a specific quality on each market, one can think that this result confirms that part of the increase in unit values with distance is due to mark-up changes.

5. Concluding Remarks

This paper focuses on the impact of transport costs on prices set by French exporters. The theoretical part of this paper points out the importance of the formulation of transport costs to determine the spatial pricing policy adopted by firms. It shows that the use of either additive or iceberg transport costs can generate different predictions concerning the reaction of firms' prices to changes in the distance to foreign buyers.

[26] I also use the BEC classification to distinguish the effect of distance on prices for intermediate, consumption, capital and primary goods. The coefficients on prices remain positive and significant with similar magnitude whatever the type of good. Results are available upon request.

[27] By contrast, some firms export more than 1,000 different products.

The empirical part shows that French firms set higher fob prices toward more distant countries. Robustness checks confirm this result. Nonetheless prices are approximated by unit values. Thus, it is hard to say whether these price changes with the distance reflect changes in mark-ups or in quality. Probably both forces are at stake.

Actually two (possibly complementary) phenomena can explain the positive relationship between prices and distance at the firm level. First, firms might adopt a reverse dumping strategy when setting their prices. This means that they charge higher mark-ups o distant buyers. Second if it exists a heterogeneity in terms of quality within firms, then, the increase in unit values might be a composition effect: the share of high quality (more expensive) goods sold by a given firm increases with the distance which increases the observed unit value. In the first case, reverse dumping appears under reasonable conditions only if trade costs have an additive part. In the second case, quality increases with the distance if there is an additive part in the trade cost as well. Therefore, the two phenomena have a common determinant: the presence of an additive component, moving with the distance, in the transport cost.

The positive impact of distance on prices set by exporting firms has three consequences. First, it shows the limit of existing models in their predictions about prices. Second, it questions the use of iceberg transport costs, at least when studying the relation between prices or unit values and distance. Third, it suggests that the introduction of an additive component in transport costs helps to reconcile theoretical models with data.

REFERENCES

Anderson, J. E. and van Wincoop, E. (2003), 'Gravity with gravitas: A solution to the border puzzle', *American Economic Review* **93**(1), 170–192.

Baldwin, R. and Harrigan, J. (2007), Zeros, quality and space: Trade theory and trade evidence, CEPR Discussion Papers 6368, C.E.P.R. Discussion Papers.

Bottazzi, L. and Ottaviano, G. (1996), Modelling transport costs in international trade: A comparison among alternative approaches, Working Papers 105, IGIER (Innocenzo Gasparini Institute for Economic Research), Bocconi University.

Brander, J. A. (1981), 'Intra-industry trade in identical commodities', *Journal of International Economics* **11**(1), 1–14.

Brander, J. and Krugman, P. (1983), 'A 'reciprocal dumping' model of international trade', *Journal of International Economics* **15**(3-4), 313–321.

Corsetti, G. and Dedola, L. (2005), 'A macroeconomic model of international price discrimination', *Journal of International Economics* **67**(1), 129–155.

Disdier, A.-C. and Head, K. (2008), 'The puzzling persistence of the distance effect on bilateral trade', *The Review of Economics and Statistics* **90**(1), 37–48.

Eaton, J. and Kortum, S. (2002), 'Technology, geography, and trade', *Econometrica* **70**(5), 1741–1779.

Fontagné, L., Gaulier, G. and Zignago, S. (2008), 'Specialization across varieties and north-south competition', *Economic Policy* **23**, 51–91.

Gaulier, G. and Zignago, S. (2008), Baci: A world database of international trade analysis at the product-level, Cepii working paper, CEPII.

Greenhut, M. L. (1981), 'Spatial Pricing in the United States, West Germany and Japan', *Economica* **48**(189), 79–86.

Greenhut, M. L., Ohta, H. and Sailors, J. (1985), 'Reverse dumping: A form of spatial price discrimination', *Journal of Industrial Economics* **34**(2), 167–81.

Hallak, J. C. and Sivadasan, J. (2009), Firms' exporting behavior under quality constraints, Working Paper 14928, National Bureau of Economic Research.

Harrigan, J. (2005), Airplanes and comparative advantage, Working Paper 11688, National Bureau of Economic Research.

Hoover, Edgar M., J. (1937), 'Spatial price discrimination', *The Review of Economic Studies* **4**(3), 182–191.

Hummels, D. and Klenow, P. J. (2005), 'The variety and quality of a nation's exports', *American Economic Review* **95**(3), 704–723.

Hummels, D. and Lugovskyy, V. (2009), 'International pricing in a generalized model of ideal variety', *Journal of Money, Credit and Banking* **41**(s1), 3–33.

Hummels, D. and Skiba, A. (2004), 'Shipping the Good Apples Out? An Empirical Confirmation of the Alchian-Allen conjecture', *Journal of Political Economy* **112**(6), 1384–1402.

Kravis, I. and Lipsey, R. (1974), International Trade Prices and Price Proxies, *in* N. Ruggles, ed., 'The Role of the Computer in Economic and Social Research in Latin America', New York : Columbia University Press, pp. 253–66.

Krugman, P. (1980), 'Scale economies, product differentiation, and the pattern of trade', *American Economic Review* **70**(5), 950–959.

Lancaster, K. (1979), 'Variety, equity and efficiency: Product variety in an industrial society : By kelvin lancaster. new york: Columbia university press, 1979. pp. 373', *Journal of Behavioral Economics* **8**(2), 195–197.

Manova, K. and Zhang, Z. (2009), Export prices and heterogeneous firm models, Working Paper 15342, National Bureau of Economic Research.

Mayer, T. and Ottaviano, G. (2007), 'The happy few: new facts on the internationalisation of european firms', *Bruegel-CEPR EFIM2007 Report, Bruegel Blueprint Series.* .

Mayer, T. and Zignago, S. (2006), Notes on cepii's distance measures, Technical report.

McCann, P. (2005), 'Transport costs and new economic geography', *Journal of Economic Geography* **5**(3), 305–318.

Melitz, M. J. (2003), 'The impact of trade on intra-industry reallocations and aggregate industry productivity', *Econometrica* **71**(6), 1695–1725.

Melitz, M. J. and Ottaviano, G. I. P. (2008), 'Market size, trade, and productivity', *Review of Economic Studies* **75**(1), 295–316.

Mellon, W. G. (1959), 'On the treatment of distance in international trade theory', *Journal of Economics* **19**(1-2), 66–85.

Méjean, I. and Schwellnus, C. (2009), 'Price convergence in the European Union: Within firms or composition of firms?', *Journal of International Economics* **78**(1), 1 – 10.

Ottaviano, G., Tabuchi, T. and Thisse, J.-F. (2002), 'Agglomeration and trade revisited', *International Economic Review* **43**(2), 409–436.

Pigou, A. C. (1952), 'The transfer problem and transport costs', *The Economic Journal* **62**(248), 939–941.

Samuelson, P. A. (1954), 'The transfer problem and transport costs, II: Analysis of effects of trade impediments', *The Economic Journal* **64**(254), 264–289.

Schott, P. K. (2004), 'Across-product versus within-product specialization in international trade', *The Quarterly Journal of Economics* **119**(2), 646–677.

Silver, M. (2007), 'Do unit value Export, Import, and Terms of Trade Indices Represent or Misrepresent Price Indices?', *IMF Working Paper* **07/121**.

Verhoogen, E. A. (2008), 'Trade, quality upgrading, and wage inequality in the mexican manufacturing sector', *The Quarterly Journal of Economics* **123**(2), 489–530.

Wooldridge, J. M. (2005), Cluster sample methods in applied econometrics: an extended analysis, https://www.msu.edu/ẽc/faculty/wooldridge/current%20research/clus1aea.pdf.

APPENDIX

A. CES, monopolistic competition and endogenous choice of quality

The utility function is a CES augmented to take into account the quality. The demand in country j for a given variety with quality λ is:

$$q_j = p_j^{-\sigma} \lambda_j^{\sigma-1} \frac{E}{P} \tag{16}$$

where p_j is the cif price in the market j, σ is the elasticity of substitution (greater than one), λ is the quality offered by the firm on the market j, E is the level of expenditure, and P is a price aggregator. The cif price is linked to the fob price by the following formulation : $p_{cif} = \tau p_{fob} + f$ where τ and f have the properties described previously.

The production function is similar to the one used in Section 2, but it varies with the quality. Producing a greater quality is costly because it increases the marginal cost, but also because it forces to pay a higher fixed cost. The profit of a firm serving country j can be written:

$$\pi_j = \left(p_j^{fob}(\lambda) - c(\lambda) \right) q_j(p, \lambda) - F(\lambda) \tag{17}$$

For technical convenience, I specify both the form of the marginal and the fixed costs. The marginal cost is given by $c(\lambda) = w\lambda^\beta$ where β lies between zero and one. The fixed cost is given by $F(\lambda) = g\lambda^\alpha$. The maximization process occurs in two steps. First, the firm sets its optimal price, considering the quality as given. Then, substituting the optimal price in the profit function, the firm maximizes its profit with respect to the quality.

The profit derivative with respect to the fob leads to same result than above:

$$p_{fob} = \frac{1}{\sigma - 1} \frac{f}{\tau} + \frac{\sigma}{\sigma - 1} c(\lambda) \tag{18}$$

Using expression (18), the first order condition with respect to λ leads to the following expression:

$$H(\lambda, \tau, f) = \left(\frac{\sigma}{\sigma - 1} \right)^{-\sigma} \frac{E}{P} \tau^{-\sigma} \left[\lambda^{\sigma-2} \left(\frac{f}{\tau} + w\lambda^\beta \right)^{-\sigma} \left(\frac{f}{\tau} + w\lambda^\beta (1 - \beta) \right) \right] - g\alpha\lambda^{\alpha-\sigma+1} = 0 \tag{19}$$

The expression $H(\lambda, \tau, f) = 0$ does not have close form solution except if one sets $f = 0$. In that case, the Hallak and Sivadasan (2009) solution for λ is:

$$H(\lambda, \tau, 0) = 0$$
$$\Leftrightarrow \lambda = \left[\tau^{-\sigma} \left(\frac{\sigma - 1}{\sigma} \right) \frac{E}{P} \frac{(1-\beta)}{\alpha} \frac{1}{wg} \right]^{\alpha'} \tag{20}$$

where $\alpha' = \alpha - (\sigma - 1)(1 - \beta)$ and $\alpha' > 0$. Visual inspection shows that quality decreases with the iceberg trade cost. If $f = 0$ the price is a constant markup over the marginal cost. Since the marginal cost is an increasing function of λ, then price decreases with distance since quality decreases.

Does the additive part of the transportation cost change the sign of this relation? There is no close form solution for λ in that case. Nevertheless one can discuss what happens when τ increases (keeping f constant) and when f increases (keeping τ constant). This discussion is done in a neighborhood of the solutions of the equation.

Since $H(0, \tau, f)$ is positive and $H(\lambda, \tau, f)$ tends to negative infinity when λ tends to positive infinity, then there exists at least one λ such as $H(\lambda, f, \tau) = 0$. In that case, assuming f and τ independent, one has:

$$\frac{\partial H(\lambda, \tau, f)}{\partial \tau} + \frac{\partial H(\lambda, \tau, f)}{\partial \lambda} \frac{\partial \lambda}{\partial \tau} = 0 \tag{21}$$

and

$$\frac{\partial H(\lambda, \tau, f)}{\partial f} + \frac{\partial H(\lambda, \tau, f)}{\partial \lambda} \frac{\partial \lambda}{\partial f} = 0 \tag{22}$$

knowing the signs of $\frac{\partial H(\lambda,\theta)}{\partial \theta}$ and $\frac{\partial H(\lambda,\tau,f)}{\partial \lambda}$, it is easy to find the signs of $\frac{\partial \lambda}{\partial f}$ and $\frac{\partial \lambda}{\partial \tau}$.

Since λ is positive, $H(0, \tau, f)$, is positive and $H()$ reaches a limit in negative infinity, then $\frac{\partial H(\lambda,\tau,f)}{\partial \lambda}$ is on average negative.[28] In Appendix, I compute the sign of $\frac{\partial \lambda}{\partial \tau}$ which turns out to be negative and the sign of $\frac{\partial \lambda}{\partial f}$ which turns out to be positive. Consequently, for a given, f, an increase in τ reduces the quality whereas, given τ an increase in f increases the quality. In a nutshell, the price (and the quality) increases when the additive trade cost increases whereas it decreases when iceberg transport costs increases.

B. Complementary Results

C. Value, Quantity and Distance

[28] In fact, $\frac{\partial H(\lambda,\tau,f)}{\partial \lambda}$ is always negative. A formal proof is available upon request.

Table B.1: Price and distance, 2005, random effects

Dependent variable:	Price (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
Distance (log)	0.048[a]	0.050[a]	0.053[a]	0.062[a]	0.072[a]	0.087[a]
	(0.010)	(0.014)	(0.005)	(0.008)	(0.009)	(0.009)
GDP (log)				-0.002	-0.002	0.011[a]
				(0.004)	(0.007)	(0.003)
GDPc (log)				0.024[a]	0.045[a]	0.035[a]
				(0.006)	(0.012)	(0.005)
Constant	0.003	0.004	-0.010[b]	0.011[a]	-0.008	-0.015[b]
	(0.005)	(0.007)	(0.005)	(0.004)	(0.005)	(0.006)
Fixed effects	Firm × Product					
Random effects	Country					
Sample:	All	OECD	Eurozone	All	OECD	Eurozone
Observations	2035072	1487782	920671	2035072	1487782	920671
R^2						
rho	0.008	0.007	0.000	0.007	0.005	0.000

Robust standard errors in parentheses

[c] p<0.1, [b] p<0.05, [a] p<0.01

variables with * are variables removed from their firm product means.

Table B.2: Prices and distance intervals at the firm level, random effets

Dep. variable		Price (log)	
	(1)	(2)	(3)
1500< distance <3000	0.018[a]	0.026[a]	0.038[a]
	(0.001)	(0.002)	(0.002)
3000< distance <6000	0.086[a]	0.118[a]	0.126[a]
	(0.002)	(0.003)	(0.003)
6000< distance < 12000	0.129[a]	0.150[a]	0.156[a]
	(0.002)	(0.002)	(0.002)
12000< distance	0.171[a]	0.167[a]	0.176[a]
	(0.006)	(0.006)	(0.006)
GDP (log)		-0.001[a]	0.001[b]
		(0.000)	(0.001)
GDPc (log)		0.022[a]	0.022[a]
		(0.001)	(0.001)
1 if euro-country			-0.031[a]
			(0.001)
1 for OECD			0.004[b]
			(0.002)
1 for contiguity			0.022[a]
			(0.001)
1 for common language			0.002[c]
			(0.001)
1 if landlocked			0.030[a]
			(0.002)
Constant	0.000	0.000	0.004[a]
	(0.000)	(0.000)	(0.001)
Fixed effects		Firm × Product	
Random effects		Country	
Sample	All	All	All
Observations	1533206	1533206	1533206

Robust standard errors in parentheses

[c] p<0.1, [b] p<0.05, [a] p<0.01

Table B.3: Price and distance, 2004

Dependent variable:	Price (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
Distance (log)	0.041^a	0.043^b	0.009	0.050^a	0.051^a	0.017^b
	(0.014)	(0.020)	(0.006)	(0.012)	(0.015)	(0.007)
GDP (log)				-0.001	-0.000	0.001
				(0.004)	(0.007)	(0.003)
GDPc (log)				0.019^a	0.050^b	0.021
				(0.007)	(0.019)	(0.012)
Fixed effects	Firm × Product					
Sample:	All	OECD	Eurozone	All	OECD	Eurozone
Observations	1768940	1281697	778284	1768940	1281697	778284
R^2	0.003	0.003	0.000	0.004	0.005	0.000
rho	0.923	0.933	0.937	0.923	0.933	0.937

Clustered *t* statistics in parentheses
^{c} p<0.1, ^{b} p<0.05, ^{a} p<0.01

Table B.4: Prices and distance, (CN8) monoproduct firms

Dependent variable:	Price (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
Distance (log)	0.046	0.053	0.027^c	0.060^c	0.071^b	0.048^a
	(0.038)	(0.040)	(0.013)	(0.031)	(0.030)	(0.012)
GDP (log)				-0.013	-0.015	-0.007
				(0.012)	(0.015)	(0.013)
GDPc (log)				0.038^c	0.084^c	0.053^a
				(0.021)	(0.047)	(0.016)
Constant	2.119^a	2.193^a	1.784^a	1.725^a	1.287^a	1.144^a
	(0.291)	(0.294)	(0.084)	(0.216)	(0.368)	(0.235)
Fixed effects	Firm × Product					
Sample:	All	OECD	Eurozone	All	OECD	Eurozone
Observations	52368	34684	16194	52368	34684	16194
R^2	0.005	0.007	0.001	0.008	0.012	0.002
rho	0.964	0.967	0.970	0.964	0.967	0.970

Clustered *t* statistics in parentheses
^{c} p<0.1, ^{b} p<0.05, ^{a} p<0.01

Table C.5: Value and distance

Dependent variable:	Value (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
Distance (log)	-0.247[b]	-0.234	-0.992[a]	-0.196[b]	-0.315[a]	-1.181[a]
	(0.117)	(0.181)	(0.239)	(0.080)	(0.104)	(0.264)
GDP (log)				0.349[a]	0.451[a]	0.358[a]
				(0.036)	(0.068)	(0.078)
GDPc (log)				-0.107[c]	-0.025	-1.120[b]
				(0.058)	(0.156)	(0.397)
Fixed effects	Firm × Product					
Sample:	All	OECD	Eurozone	All	OECD	Eurozone
Observations	2035072	1487782	920671	2035072	1487782	920671
R^2	0.011	0.008	0.048	0.087	0.088	0.105
rho	0.618	0.642	0.691	0.655	0.661	0.703

Clustered *t* statistics in parentheses
[c] p<0.1, [b] p<0.05, [a] p<0.01

Table C.6: Quantity and distance

Dependent variable:	Quantity (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
Distance (log)	-0.291[b]	-0.282	-0.997[a]	-0.250[a]	-0.371[a]	-1.195[a]
	(0.115)	(0.175)	(0.237)	(0.080)	(0.102)	(0.264)
GDP (log)				0.347[a]	0.448[a]	0.355[a]
				(0.036)	(0.067)	(0.078)
GDPc (log)				-0.127[b]	-0.077	-1.141[b]
				(0.056)	(0.151)	(0.397)
Fixed effects	Firm × Product					
Sample:	All	OECD	Eurozone	All	OECD	Eurozone
Observations	2035072	1487782	920671	2035072	1487782	920671
R^2	0.015	0.011	0.047	0.083	0.086	0.104
rho	0.719	0.732	0.770	0.746	0.751	0.781

Clustered *t* statistics in parentheses
[c] p<0.1, [b] p<0.05, [a] p<0.01

LIST OF WORKING PAPERS RELEASED BY CEPII

An Exhaustive list is available on the website: \\www.cepii.fr.
To receive an alert, please contact Sylvie Hurion (sylvie.hurion@cepii.fr).

No	***Tittle***	***Authors***
2009-20	Is Russia Sick with the Dutch disease?	V. Dabrynskaya & E. Turkisch
2009-19	Économies d'agglomération à l'exportation et difficulté d'accès aux marchés	P. Koenig, F. Mayneris & S. Poncet
2009-18	Local Export Spillovers in France	P. Koenig, F. Mayneris & S. Poncet
2009-17	Currency Misalignments and Growth: A New Look using Nonlinear Panel Data Methods	S. Béreau, A. López Villavicencio & V. Mignon
2009-16	Trade Impact of European Measures on GMOs Condemned by the WTO Panel	A. C. Disdier & L. Fontagné
2009-15	Economic Crisis and Global Supply Chains	A. Bénassy-Quéré, Y. Decreux, L. Fontagné & D. Khoudour-Casteras
2009-14	Quality Sorting and Trade: Firm-level Evidence for French Wine	M. Crozet, K. Head & T. Mayer
2009-13	New Evidence on the Effectiveness of Europe's Fiscal Restrictions	M. Poplawski Ribeiro
2009-12	Remittances, Capital Flows and Financial Development during the Mass Migration Period, 1870-1913	R. Esteves & D. Khoudour-Castéras
2009-11	Evolution of EU and its Member States'Competitiveness in International Trade	L. Curran & S. Zignago
2009-10	Exchange-Rate Misalignments in Duopoly: The Case of Airbus and Boeing	A. Bénassy-Quéré, L. Fontagné & H. Raff
2009-09	Market Positioning of varieties in world trade: Is Latin America Losing out on Asia?	N. Mulder, R. Paillacar & S. Zignago
2009-08	The Dollar in the Turmoil,	A Bénassy-Quéré, S. Béreau & V. Mignon

No	***Tittle***	***Authors***
2009-07	Term of Trade Shocks in a Monetary Union: An Application to West-Africa	L. Batté, A. Bénassy-Quéré, B. Carton & G. Dufrénot
2009-06	Macroeconomic Consequences of Global Endogenous Migration: A General Equilibrium Analysis	V. Borgy, X. Chojnicki, G. Le Garrec & C. Schwellnus
2009-05	Équivalence entre taxation et permis d'émission échangeables	P. Villa
2009-04	The Trade-Growth Nexus in the Developing Countries: a Quantile Regression Approach	G. Dufrénot, V. Mignon & C. Tsangarides
2009-03	Price Convergence in the European Union: within Firms or Composition of Firms?	I. Méjean & C. Schwellnus
2009-02	Productivité du travail : les divergences entre pays développés sont-elles durables ?	C. Bosquet & M. Fouquin
2009-01	From Various Degrees of Trade to Various Degrees of Financial Integration: What Do Interest Rates Have to Say	A. Bachellerie, J. Héricourt & V. Mignon
2008-32	Do Terms of Trade Drive Real Exchange Rates? Comparing Oil and Commodity Currencies	V. Coudert, C. Couharde & V. Mignon
2008-31	Vietnam's Accession to the WTO: Ex-Post Evaluation in a Dynamic Perspective	H. Boumellassa & H. Valin
2008-30	Structural Gravity Equations with Intensive and Extensive Margins	M. Crozet & P. Koenig
2008-29	Trade Prices and the Euro	J. Martin & I. Méjean
2008-28	Commerce international et transports : tendances du passé et prospective 2020	C. Gouel, N. Kousnetzoff & H. Salman
2008-27	The Erosion of Colonial Trade Linkages after Independence	T. Mayer, K. Head & J. Ries
2008-26	Plus grandes, plus fortes, plus loin… Performances relatives des firmes exportatrices françaises	M. Crozet, I. Méjean & S. Zignago
2008-25	A General Equilibrium Evaluation of the Sustainability of the New Pension Reforms in Italy	R. Magnani
2008-24	The Location of Japanese MNC Affiliates: Agglomeration, Spillovers and Firm Heterogeneity	T. Inui, T. Matsuura & S. Poncet
2008-23	Non Linear Adjustment of the Real Exchange Rate Towards its Equilibrium Values	S. Béreau, A. Lopez Villavicencio & V. Mignon

No	***Tittle***	***Authors***
2008-22	Demographic Uncertainty in Europe – Implications on Macro Economic Trends and Pension Reforms – An Investigation with the INGENUE2 Model	M. Aglietta & V. Borgy
2008-21	The Euro Effects on the Firm and Product-Level Trade Margins: Evidence from France	A. Berthou & L. Fontagné
2008-20	The Impact of Economic Geography on Wages: Disentangling the Channels of Influence	L. Hering & S. Poncet
2008-19	Do Corporate Taxes Reduce Productivity and Investment at the Firm Level? Cross-Country Evidence from the Amadeus Dataset	J. Arnold & C. Schwellnus
2008-18	Choosing Sensitive Agricultural Products in Trade Negotiations	S. Jean, D. Laborde & W. Martin
2008-17	Government Consumption Volatility and Country Size	D. Furceri & M. Poplawski Ribeiro
2008-16	Inherited or Earned? Performance of Foreign Banks in Central and Eastern Europe	O. Havrylchyk & E. Jurzyk
2008-15	The Effect of Foreign Bank Entry on the Cost of Credit in Transition Economies. Which Borrowers Benefit most?	H. Degryse, O. Havrylchyk, E. Jurzyk & S. Kozak
2008-14	Contagion in the Credit Default Swap Market: the Case of the GM and Ford Crisis in 2005.	V. Coudert & M. Gex
2008-13	Exporting to Insecure Markets: A Firm-Level Analysis	M. Crozet, P. Koenig & V. Rebeyrol
2008-12	Social Competition and Firms' Location Choices	V. Delbecque, I. Méjean & L. Patureau
2008-11	Border Effects of Brazilian States	M. Daumal & S. Zignago
2008-10	International Trade Price Indices	G. Gaulier, J. Martin, I. Méjean & S. Zignago
2008-09	Base de données CHELEM – Commerce international du CEPII	A. de Saint Vaulry
2008-08	The Brain Drain between Knowledge Based Economies: the European Human Capital Outflows to the US	A. Tritah
2008-07	Currency Misalignments and Exchange Rate Regimes in Emerging and Developing Countries	V. Coudert& C. Couharde
2008-06	The Euro and the Intensive and Extensive Margins of Trade: Evidence from French Firm Level Data	A. Berthou & L. Fontagné

No	***Tittle***	***Authors***
2008-05	On the Influence of Oil Prices on Economic Activity and other Macroeconomic and Financial Variables	F. Lescaroux& V. Mignon
2008-04	An Impact Study of the EU-ACP Economic Partnership Agreements (EPAs) in the Six ACP Regions	L. Fontagné, D. Laborde & C. Mitaritonna
2008-03	The Brave New World of Cross-Regionalism	A. Tovias
2008-02	Equilibrium Exchange Rates: a Guidebook for the Euro-Dollar Rate	A. Bénassy-Quéré, S. Béreau & V. Mignon
2008-01	How Robust are Estimated Equilibrium Exchange Rates? A Panel BEER Approach	A. Bénassy-Quéré, S. Béreau & V. Mignon

Organisme public d'étude et de recherche en économie internationale, le CEPII est placé auprès du Centre d'Analyse Stratégique. Son programme de travail est fixé par un conseil composé de responsables de l'administration et de personnalités issues des entreprises, des organisations syndicales et de l'Université.

Les *documents de travail* du CEPII mettent à disposition du public professionnel des travaux effectués au CEPII, dans leur phase d'élaboration et de discussion avant publication définitive. Les *documents de travail* sont publiés sous la responsabilité de la direction du CEPII et n'engagent ni le conseil du Centre, ni le Centre d'Analyse Stratégique. Les opinions qui y sont exprimées sont celles des auteurs.

Les *documents de travail* du CEPII sont disponibles sur le site : http//www.cepii.fr.

CEPII
9, RUE GEORGES PITARD, 75740 PARIS CEDEX 15
SYLVIE HURION – PUBLICATIONS
TÉL : 01 53 68 55 14 - FAX : 01 53 68 55 04
sylvie.hurion@cepii.fr

ISSN : 1293-2574