



Inattentive importers[☆]

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ABSTRACT

Information frictions prevent importers from observing the price of a good in every market. In this paper, we seek to explain how the presence of such frictions shapes the flow of goods between countries. To this end, we introduce rationally inattentive importers in a multi-country Ricardian trade model. The amount of information importers process is endogenous and reacts to changes in observable trade costs. Unlike traditional trade costs, changes in information processing costs have non-monotonic and asymmetric effects on bilateral trade flows. The model generates a novel prediction regarding the relationship between information processing costs and concentration of imports that finds support in the data. We calibrate the model, perform counterfactuals and show quantitatively how the response of trade flows to exogenous trade shocks gets magnified under inattention.

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1. Introduction

Incomplete information plagues international commerce. Importers rarely observe the price and attributes of a good in every market. These informational barriers are bound to have an impact on the flow of goods between countries. Yet, despite a widespread agreement among economists that incomplete information could create significant barriers to trade, we lack a framework that formalizes the link between information and trade.¹

In this paper, we attempt to develop such a framework. Our paper makes three main contributions. First, we formally derive a relationship between the probability of importing a product from a particular source country and the cost of processing information. A characteristic feature of our framework is that these probabilities not only respond directly to any change in model parameters, but also indirectly through a change in information processed. Second,

we provide evidence that the import distribution for a product is, on average, less concentrated in countries with intermediate levels of information processing costs. We argue that this finding is consistent with our model of inattention, but is not predicted by standard full information models of trade. Third, we show quantitatively how, in the presence of information processing costs, a small increase in tariffs gets translated into a decline in imports that is significantly larger relative to a model without information frictions.

Specifically, we introduce rational inattention (Sims, 2003, 2006) into a multi-country, Ricardian model of trade. Every period, producers draw productivity stochastically. Importers would like to import a product from the country that has the lowest price. But importers have a limited capacity to process information about prices. Faced with a capacity constraint, importers must decide how much information to process about prices in each country. More information increases the precision of the noisy signals received by the importers, but comes at a higher cost. The rational importer weighs the marginal benefit of an extra unit of information against the marginal cost.

A key insight of our model is that the endogenous processing of information affects the response of trade flows to a change in observable trade costs between trading partners. When a trade cost, such as transport cost, between importing country j and exporting country i declines, country j importers start to purchase more from country i because the expected price offered by country i producers is now lower. This is the standard effect of trade costs on trade flows present

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¹ In their survey on trade costs, Anderson and van Wincoop (2004) highlight the need for more careful modelling of information frictions.

in any trade model. Our model has an additional information effect. Faced with a cost of processing information, importers in country j choose how much information to process about every source country. A lower expected price in country i raises the expected benefit of processing information about country i . Country j importers respond by paying more attention to country i and less attention to every other country, thereby boosting the volume of trade between j and i further. Thus, when importers are rationally inattentive, small differences in observable trade costs can have large effects on trade flows – there is a *magnification effect*.

Following Matejka and McKay (2014), we show that the optimal solution of a rationally inattentive importer is to choose probabilistically the country from where to buy a given product, with this probability distribution following an adjusted multinomial logit. In the full information model of Eaton and Kortum (2002), while the prior probability that country j imports a product from country i is positive for every i , the corresponding posterior probability is either zero or one. In our model, however, the posterior probability is also positive for every i . This is because, even after productivity draws are realized, importers in country j do not perfectly observe prices and hence attach a positive probability to every country i having the lowest price. The implications are twofold. First, a country can buy the same product from different source countries. Second, a country can import and export the same product at the same time. Currently, such patterns in the data are rationalized by appealing to intra-industry trade.²

The key parameter in our model is the cost of processing information. We show that, unlike traditional trade costs, information costs may have asymmetric effects on bilateral trade shares. An increase in information costs may lead importers to choose to process more information about countries that have lower expected prices.³ This will result in an increase in import shares from these countries, to the detriment of countries that have higher expected price – it is *as if* the importing country has imposed import tariffs that are higher for countries that have higher expected price. A uniform increase in standard trade costs can not generate such an outcome. We also show that, unlike traditional trade costs, information costs may have non-monotonic effects on bilateral trade shares as the share of imports first rises but then declines when information costs increase. As mentioned above, an increase in information costs might cause importers to re-allocate attention towards a small set of countries, causing the import shares from those countries to rise. But further increases in these costs will eventually remove some countries from this set, causing their import shares to decline.

Our model generates a novel prediction linking the concentration of imports with the cost of processing information. In the absence of information costs, importers purchase a product from one country only – the country offering the lowest price. Accordingly, the import distribution is degenerate. But when information costs are infinitely high, importers again purchase from one country only – the country with the lowest expected price. For intermediate values of information costs, importers diversify. In fact, we show that the concentration of the import distribution for a given product and importing country exhibits a U-shape with respect to information costs, where concentration is measured using the Herfindahl-Hirschman index. We also note that none of the standard models of trade generate a systematic relation between the concentration of imports on the one hand, and importing country characteristics on the other. In the final part of the paper, we test this prediction. We postulate that countries differ in terms of their costs of processing information. We measure information costs with international bandwidth, which is a country-specific variable that determines the speed of data flow. To allow as

much flexibility as possible, we carry out a non-parametric approach to examine the relationship between information costs and the concentration of imports. We show that the concentration of imports declines for small values of the information cost but rises for large values. This relationship is robust to a number of controls.

In the last part of the paper, we examine whether information costs matter quantitatively. In order to do so, we numerically solve two 25-country models – one with full information, and the other with inattentive importers. We calibrate the parameters of the two models such that they match the same set of moments. We then perform the following counterfactual: NAFTA termination. In this exercise, we raise import tariffs from 0 to 5% between the U.S., Canada and Mexico, the three members of the North American Free Trade Agreement (NAFTA). An increase in U.S. tariffs on imports from Canada and Mexico reduces import shares from those countries, while raising the own import share of the U.S. This effect is significantly larger when importers endogenously process information. As imports from its neighbours become more expensive on average, U.S. importers start paying less attention to those countries. This ends up magnifying the effect of the tariffs on trade flows.

To the best of our knowledge, we are the first to apply the theory of rational inattention to the study of international trade. Our decision to model information as a theory of attention allocation is guided by the following consideration: attention is a major area of investigation in education, psychology and neuroscience, and its influence is growing in economics and finance. As suggested by Kahneman (1973), the human mind is bounded by cognitive limits and even if individuals had access to full information, their mind would be unable to process all the available information. Individuals would then have to choose how to allocate their limited cognitive attention resources to process information when making decisions. Hence, selectively focusing more cognitive resources on one option would result in a decrease of cognitive attention to alternative options. In the context of international trade, a consequence of rational inattention is that unlike most papers that deal with information frictions, importers in our model choose to process different amounts of information about product prices in different source countries.

In one of the first papers to highlight the role of information frictions in shaping international trade flows, Rauch (1999) provided evidence that proximity, common language and colonial ties are more important for trade in differentiated products, which are presumably more dependent on information, than for products traded on organized exchanges and those that have reference prices. Chaney (2014) incorporates exporter networks into a model of trade. Among other things, he shows that his network model can explain the distribution of foreign markets accessed by individual exporters – a fact suggestive of the presence of informational barriers. Drawing an analogy with astrophysics, Head and Mayer (2013) point out that at most 30% of the variation in trade flows can be explained by observable freight costs, while the remaining 70% of the variation is due to a “dark” trade cost. The authors argue that one significant component of these dark costs must be information costs.

Two recent papers have provided further evidence of informational barriers in goods trade. Looking at the market for agricultural goods in Philippines, Allen (2014) demonstrated that a number of features of the data can be explained by a model with information frictions, but are not consistent with a full information model. Steinwender (2018) shows how the establishment of trans-Atlantic telegraph lines, that speeded up the flow of information between the U.S. and U.K., led to a convergence in prices and higher trade volumes for cotton.⁴

² But see Allen (2014) for an exception.

³ A lower expected price could arise either due to lower bilateral trade cost or higher average productivity.

⁴ Other papers that provide evidence that is consistent with the presence of information frictions in trade include Gould (1994), Head and Ries (1998), Rauch and Trindade (2002), Freund and Weinhold (2004), Fink et al. (2005), Combes et al. (2005) and Chan (2016).

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