國立臺灣大學 110 學年度農業經濟學系博士班入學考

考試時間為 15:40~17:40。試題請隨答案本繳回。

英文　第(一)卷

2021/4/23

本試卷分為第(一)卷與第(二)卷，卷(一)共 2 題，總分 50 分。
請將答案分別填寫於相對應試卷之答案本內。

第一題：中翻英 (25%) ***Don't do literal translation. Treat the paragraph as a whole.***

影響食品供應鏈任何環節之危機皆會衝擊糧食安全，例如此次全球新冠肺炎大流行突顯糧食產業工作者的重要性，疫病造成食品供應鏈物流中斷、工人染疫、喪失市場、消費形態改變等，嚴重衝擊糧食供應體系。為利食品加工、供應與零售廠商提供符合健康與永續規範之食品，歐盟規劃內容包括重新訂定健康與永續飲食、修改行銷與廣告策略以照顧易受傷害族群需求、 確保食品價格競爭不至於影響市民對優質食品的認知、減少食品包裝等規範。

美國農業部經濟研究局針對歐盟綠色新政之「從農場到餐桌策略」與「生物多樣性策略」提出影響研究報告，結論認為 2 項策略目的在於減少土地、肥料、抗菌劑與農藥使用，將從根本上改變歐盟食品與農業政策，並影響歐盟農企業結構與生產力，歐盟身為國際農產品貿易重要之生產者與進口者，亦將影響國際農產品生產與貿易體系。研究分析方式將政策影響範圍分為「影響僅局限在歐盟境內」、「影響與歐盟農產品貿易往來密切國家之政策」及「影響全球政策」等 3 種。

第二題：英翻中 (25%) ***Don't do literal translation. Treat the paragraph as a whole.***

Supermarkets continued to diffuse and diversify formats (beyond "big box" stores on the peripheries of cities and into convenience stores for penetration of dense inner cities). Supermarkets and other modern retail outlets such as convenience store chains used their large economies of scale on the procurement side to supply modern retail outlets whether the outlets were chains of small stores or large stores. The mega and super stores allowed for increasingly large economies of scope. The small modern stores (convenience store chains and small format supermarkets) relied on economies of scale on the procurement side and low transaction costs and a processed product focus on the consumer side. The first stage of e-commerce exactly parallels the early portion of the first stage of supermarket penetration, that is, in selling only dry goods and economies of scale in procurement but not yet economics of scope (as the early e-commerce had relatively narrow product lines). This E-commerce is also competitive with supermarkets on economies of scale in product procurement, storage, and retailing. The transaction cost reduction of early e-commerce was a mimicry of fast pizza delivery arranged by phone. Their product cost reduction was a mimicry of what supermarkets had done with efficient supply chains and distribution centers.

How different factors could change the evolution of different types of stores are also analyzed. First, as travel costs to supermarkets decline, consumers are more likely to visit both local stores and supermarkets. Second, new technologies that lower perishables procurement costs for supermarkets (and procurement and shipping costs for perishables by e-commerce) would result in supermarkets and e-commerce carrying more perishables. Third, as consumers' wages increase (and thus opportunity costs of time) or shipping costs of online shopping decrease, consumers will buy more products online and more types of items will be carried online.

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英文　第(二)卷

2021/4/23

本試卷分為第(一)卷與第(二)卷，卷(二)共 1 題，總分 50 分。
請將答案分別填寫於相對應試卷之答案本內。

第一題：摘要 (50%) Please summarize the following paragraphs, extracted from the introduction of Shapiro (2021), within 300 Chinese characters or 200 words in English.

"This article describes a new fact, then analyzes its causes and consequences: in most countries, import tariffs and nontariff barriers (NTBs) are lower on dirty than on clean industries, where an industry's "dirtiness" is measured by its carbon dioxide (CO2) emissions per $1 of output. This difference between dirty and clean industries creates an implicit subsidy to CO2 emissions in clean industries creates an implicit subsidy to CO2 emissions in internationally traded goods and so contributes to climate change. I describe this pattern as trade policy's environmental bias.

This bias is widespread. I find it in most countries, in tariffs and NTBs, and in cooperative and noncooperative tariffs. U.S. tariff data over the past 30 years suggest this bias has slowly diminished over time, but remains large. U.S. tariffs imposed in the 2018 trade war slightly attenuated but did not eliminate this bias. The global implicit subsidy in trade policy that I estimate, of $85 to $120 per ton of CO2, is interesting because the global social cost of CO2 emissions (and hence the optimal tax on CO2 emissions) is usually estimated as around $40 per ton of CO2. The magnitude of the environmental bias of trade policy is therefore larger than what research suggests is an optimal tax on CO2 emissions, and the sign is opposite—trade policy is imposing lower tax rates on dirtier goods, while an optimal carbon policy would impose higher tax rates on dirtier goods.

One way to interpret this fact is in terms of climate change policy. Optimal climate change policy would impose a uniform Pigouvian tax (or equivalent quantity mechanism like a cap-and-trade market) in all countries and industries, since CO2 creates the same climate change externality regardless of where it is emitted. Researchers and policy makers often claim that imposing climate change policy in some countries but not others could harm domestic energy-intensive industries and lead to relocation or "leakage" of emissions, more than an absolute decrease in emissions. Climate change regulation is far from global and covers about 20% of global CO2 emissions, including in the EU, California, and elsewhere (World Bank 2018). Carbon prices in these policies differ substantially across regulations and are generally below $10/ton. Some countries have considered pairing such subglobal policy with an import tariff or border adjustment that is proportional to the CO2 emitted from producing and transporting goods.

Of course, most countries already impose tariffs and NTBs on traded goods. This article asks whether dirty industries already face higher tariffs and NTBs, which would mean that countries already implicitly have carbon tariffs in their existing trade policies. Given media emphasis on dirty industries' political lobbying, one might expect dirtier industries to receive relatively greater trade protection. I show that this prediction is incorrect, and that dirtier industries face relatively low tariffs and NTBs.

I obtain these findings from regressions of tariff (or ad valorem NTB) rates on CO2 intensity. I measure CO2 intensity by inverting a global multiregion input-output table, which accounts for emissions embodied in intermediate goods. For example, the CO2 emissions rate for U.S. kitchenware accounts for the Australian coal used to produce the Chinese steel used to produce a U.S. frying pan and the bunker and diesel fuels used to transport each. The global input-output data this article uses, from *Exiobase*, describe 48 countries and 163 industries, and so generate measures of CO2 intensity for each international and intranational trade flow in the global economy. The tariff data are even more detailed, with 200 million tariff measures that uniquely describe each origin × destination × industry. I obtain qualitatively similar results from several other data sets and sensitivity analyses.

Why have countries imposed more protection on clean than dirty industries? Theory and evidence suggest that countries do not explicitly consider CO2 or intend to subsidize it in choosing trade policy; indeed, I believe that countries are not even aware of the implicit subsidy in trade policy this article highlights, since previous literature has not tested for or identified it. Instead, this article proposes that some forces which determine trade policy are correlated with CO2 intensity.

To determine which forces account for the association between trade policy and CO2 intensity, the analysis considers explanations based on 20 variables suggested by theoretical and empirical research. These explanations include optimal tariffs (inverse export supply elasticities), lobbying expenditures, unionization, labor and capital shares, declining or "sunset" industries, worker wages and education, firm size, industry concentration rates, intra-industry trade, levels and trend in trade exposure, dispersion in firm sizes and firm locations, shipping costs, unemployment, "local" pollutants like sulfur dioxide, production efficiency, and an industry's upstream location. These variables are available for the United States; a subset is available for all countries. To address potential endogeneity, some specifications instrument a particular political economy explanation (e.g., mean wages in a specific industry) with its value from the 10 other smallest countries in the data. I focus on the 10 smallest other countries because they are more likely to take conditions in the rest of the world as given.

Among these potential explanations, linear regressions and a machine-learning algorithm highlight an industry's location or "upstreamness" in global value chains as accounting for a large share of the association between CO2 intensity and trade policy. The analysis measures upstreamness as the economic distance of each industry from final consumers. More-upstream industries have both lower protection and greater emissions. I investigate one political economy explanation for the covariance of upstreamness and trade policy involving lobbying competition. Firms may lobby for high tariffs and NTBs on their own outputs and lobby for low tariffs on the goods they use directly and indirectly as inputs, so as to decrease production costs. Because final consumers are poorly organized, politicians give the least protection to the upstream industries (which are also the dirtiest) and the greatest protection to the most downstream industries (which are also the cleanest)."

"A partial equilibrium back-of-the-envelope calculation suggests that this global implicit subsidy in trade policy to CO2 emissions totals $550 to $800 billion a year. This can be interpreted as revenue that a carbon tariff would collect if it had the same pattern as trade policy's environmental bias (i.e., −$85/ton to −$120/ton).

I then use a quantitative general equilibrium model to assess how counterfactual trade policies would affect CO2 emissions and social welfare. This analysis uses strong assumptions that provide an imperfect approximation to reality.

The model incorporates several common features—input-output links, trade imbalances, CO2 emissions from fossil fuel, tariffs that are lump-sum rebated, and NTBs. I study six sets of counterfactual policies. In the first, each country sets a single tariff per trading partner which applies to all industries and equals the country's mean baseline bilateral tariff. Each country implements a similar reform for NTBs. This counterfactual decreases global CO2 emissions while leaving global real income unchanged or slightly increased. It has similar magnitude effects on CO2 as two of the world's largest actual or proposed climate change policies, the EU Emissions Trading System and the U.S. Waxman-Markey Bill. In the second counterfactual, only the EU adopts this policy. One could think of this as a way for the EU to address leakage from its CO2 cap-and-trade market, the EU Emissions Trading System. This decreases global CO2 emissions by half the amount of the global policy and again leaves global real income unchanged or slightly higher.

The third and fourth counterfactuals find that changing tariffs and NTBs to equal either the baseline level of the cleanest third or dirtiest third of industries decreases global CO2 emissions by several percentage points. Fifth, I consider a counterfactual in which every country adds a tariff proportional to goods' CO2 intensity, that is, a carbon tariff. This has modest environmental benefits. Finally, if countries completely eliminated tariffs and NTBs, both global CO2 emissions and real income would rise. Although turning off trade policy by definition eliminates trade policy's environmental bias, the resulting increase in income dwarfs this environmental effect.

This article has potentially important policy implications. In a first-best setting where every country implemented uniform carbon prices on all CO2 emissions, trade policy would have no role in efficient climate policy. In a second-best setting where political economy constraints make optimal climate change policy infeasible, considering environmental concerns in designing trade policy could potentially increase welfare. In either setting, a trade policy that subsidizes CO2 may be inefficient, and hence limiting the greater protection of clean relative to dirty goods could increase welfare. I believe that a reform that considers the CO2 intensity of an industry in negotiating bilateral or multilateral trade policy across industries but without a formal carbon tariff has not been discussed in government or academia. Such reforms may appeal to groups that typically disagree—dirty industries and environmentalists—because they can maintain protection of dirty domestic industries (at least relative to clean industries) while decreasing global CO2 emissions. More broadly, the World Trade Organization (WTO) has sought to decrease protection of downstream relative to upstream industries, since such trade policy reforms would let developing countries sell more advanced technologies to industrialized countries. This article suggests that such WTO goals may also help address climate change."

Reference

Shapiro, J. S. (2021). The Environmental Bias of Trade Policy. *The Quarterly Journal of Economics*, *136*(2), 831-886.