Cournot's Trade Theory and its Neoclassical Appropriation: Lessons to be learnt about the Use and Abuse of Models

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1 Introduction

The ubiquitous partial equilibrium model of trade owes its origins to the work of Augustin Cournot. While Cournot's name is a staple in economic textbooks, usually in relation to oligopoly theory, his work on trade has vanished from view. This is all the more surprising, given that the partial equilibrium model that he developed, to show the effects of trade, is still in use today, but without attribution. This paper aims to address why this is the case. Key to understanding the neglect of Cournot's trade theory is to realise that he arrived at very different conclusions on the effect of trade than did his neoclassical successors, notwithstanding their deployment of a similar set of tools.

To highlight that such varying interpretations matters, I first show how impactful the neoclassical partial equilibrium model is in current pedagogy and research. I then trace the early neoclassical use of this model, in order to show that the normative conclusions arrived at by these pioneers still persist today. The rest of the article attempts to re-evaluate Cournot's trade model, including the reasons for its dismissal by early neoclassical trade theorists. What I attempt to show is that Cournot's trade model is internally consistent, albeit based on extreme assumptions. It is my contention that these assumptions are no more extreme than those invoked by neoclassical practitioners when discussing and estimating the impact of trade policies. Neither Cournot nor neoclassical practitioners could be accused of logical inconsistency, although both sides could stand accused of lack of realism when it comes to their (primarily latent) assumptions of how markets work. That a given set of tools can lead to very different conclusions is a useful exercise in reminding us that deriving normative conclusions depends on a whole supporting infrastructure of assumptions. In order to arbitrate between competing positions, it is first necessary to know that there are competing analyses. This alone justifies history of thought as an academic exercise. If diverse logically consistent theories then point to the necessity of empirical mediation in the course of their evaluation, that can only be considered an added bonus.

2 The use of Partial Equilibrium Models to evaluate trade policy

Partial equilibrium models are a widely deployed tool used to represent both the positive and normative effects of commercial policy, such as the impact of tariffs and quotas on domestic economies. The positive effects are shown as the wedge that such a policy creates between global and domestic prices, and how that price difference impacts on domestic demand, domestic supply and either exports or imports in particular markets, while the initial

normative or welfare effects are represented by changes in producer and consumer surplus. Figure 1 shows the well-known depiction of how a tariff (t) increases the global price P_w to $P_w +t$ resulting in higher domestic supply S^2 and lower domestic demand D^2. The areas A and B are considered to be the combined welfare loss from such a policy, where such loss is said to represent the allocative inefficiency of a tariff. These losses are usually categorised as production distortion losses (A), implying resource misallocation, and consumption distortion losses (B), denoting losses to consumers. In both instances such losses are deemed wasteful, since these are economic impacts that are said to benefit no one.

Figure 1 is standard fare in all undergraduate international economics textbooks, usually appearing in the chapter dealing with the instruments of trade policy and their welfare effects. But their use is not simply pedagogic, in that the calculation of presumed allocative inefficiency via the estimation of welfare loss triangles (another widely used term) is a commonplace activity of trade economists.[1] And such estimation is not confined to studies of the impact of trade policy on particular markets, it also extends to empirical work that seeks to measure the impact of trade policy on national economies and internationally. For example, the Global Trade Analysis Project (GTAP), which was established in 1992, conducts quantitative analysis of international economic issues in an economy wide framework.[2] A feature of such applied general equilibrium models like GTAP is that the welfare effects of trade are broken down into Allocative Efficiency (the welfare triangles), Terms of trade effects and Savings and Investment effects. However, while Terms of Trade and Savings and Investment effects can be positive or negative for a country (and are zero globally), it is a built-in assumption that Allocative Efficiency from trade liberalisation is always positive. This encapsulates the idea that trade is a positive sum game for all countries who engage in it.

The intent of this section has been to show that, notwithstanding advances in theoretical trade theory and in applied trade analysis, which can allow for additional effects from trade liberalisation, such as the exploitation of economies of scale, or increased efficiency due to competition, all models still incorporate estimates of the welfare triangles as shown in Figure 1.

3 Historical roots for such analysis: Conventional story

The partial equilibrium approach to markets is generally attributed to Alfred Marshall, notwithstanding the influence of Augustin Cournot on the former.[3] The distinguishing aspect of Marshall's deployment of partial equilibrium analysis was his derivation of demand from utility and the concept of consumer surplus. Its application to trade is contained in

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[1] See for example the work of Hufbauer and Elliot (1988) on the cost of protection to the US and that of Messerlin (2001) who estimated the equivalent costs for Europe.

[2] See Hertel and Tsigas (1997) for a discussion of the modelling aspects of global trade analysis.

[3] According to Creedy (1990, p. 99), Marshall said that he had read Cournot in 1868, while Vaggi and Groenewegen (2003, p. 228) confirm Cournot's influence with the information that Marshall's first paper on the theory of value written circa 1870 dealt with price determination simply in terms of supply and demand, ignoring utility.

Miscellaneous Notes on Economic Theory, printed in *Early Economic Writings* (Whitaker, 1975, pp. 246-248), which shows the gains from trade using consumer and producer surplus to evaluate such gains. Since Marshall's preceding notes were not published during his lifetime, it is difficult to know whether later writers were aware of this analysis when they developed their own trade theories employing Marshallian tools.

Marshall's student Henry Cunyghame, used the Marshallian apparatus to show the effect of import and export duties on prices, and, in the process, presented the famous back-to-back diagram showing the effect of bringing two previously isolated markets, both making and consuming the same good, into contact through trade. Ignoring transport costs and proceeding from the assumption that domestic demand and supply conditions differ in both countries, Cunyghame showed that the country with the lower autarky price would export to the one with the higher autarky price and that the post-trade price would be intermediate to both country's autarky prices and be determined by combined demand and supply conditions in both markets. (See Cunyghame, 1903). Figure 2 is a version of this analysis, though not represented in back-to-back form.

According to Viner (1965 [1937], p. 589), while Cunyghame did not draw any conclusions with respect to the gains from trade from his diagrams, Enrico Barone used the same diagram to deduce welfare conclusions. In terms of Figure 2, the free trade price p* ensures that country A's exports of q^{*s}- q^{*d} equals country B's imports of q^{*d}- q^{*s}, and country A's gains are represented by the area A, while country B's gains are represented by the area b+c.

Creedy (1990, pp. 100-101) claims that, notwithstanding his earlier notes, Marshall rejected the use of partial equilibrium schedules involving money prices when it came to analyzing foreign trade and that this is why he developed his offer curves. However, Creedy also asserts that Marshall's notes on Cournot were an attempt to translate Cournot's chapter 12 (on the effects of trade) into the now familiar triangles (Creedy, 1992, p. 13). It is not clear to me whether Creedy means that Marshall's notes were his graphical representation of Cournot's welfare analysis of the effects of trade, in which case he [Creedy] is incorrect, or whether he means that Marshall's notes represented the **transformation** of Cournot's work using the concepts of consumer and producer surplus, to give it a different normative twist (to that of Cournot). In any case, for the purposes of this paper, the important point is that the normative application of partial equilibrium analysis, as stated by Marshall in his notes, and subsequently by Barone, is what is still used today in economic pedagogy, economic theory and applied research. It also differs from Cournot's normative conclusions, even as the partial equilibrium tools used deployed by early neoclassical economists (and which still persist today) owe their origins to Cournot.

4 Originator of the Partial Equilibrium Approach to Trade: Augustin Cournot

Cournot, in chapter 10 of *Mathematical Principles of the Theory of Wealth,* addresses the effect of the integration of 2 markets that were previously isolated (Cournot, 1971[1838]). In this chapter, using demand and supply analysis that he had developed earlier in the book, he

works out conditions that must be satisfied for equilibrium to exist before trade and after trade under conditions of unlimited competition. Essentially, his analysis is what is represented in Figure 2. The positive account of the effect of market integration on the determination of prices, production and consumption in both markets and the flow of trade is essentially the same in Cournot's mathematical exposition and Cunyghame's diagrammatic one. According to Creedy (1990, p. 100), Cunynghame produced the now familiar back-to-back diagram without any reference to Cournot but virtually paraphrasing the latter's introduction to his model. He added that it is not widely recognised that Cunynghame's treatment stems from Cournot, citing how the major study on the theory of trade by Jacob Viner failed to acknowledge that the diagram represented Cournot's model (Creedy, 1990, p. 100).

Of interest in this paper is Cournot's welfare analysis, or, as he described it "how commerce between two markets … causes the value of social income to vary … in the importing as well as exporting market" (Cournot, 1971[1838], p. 150). It is here where the apparatus developed by Cournot but appropriated by others delivers vastly different conclusions.

Cournot proceeded to look at the impact of trade on the income of producers and consumers. In terms of Figure 2, he concluded that producers in the exporting country A would enjoy an increase in income equal to $p^* q^{*s} - p^a q^a$, while consumers would suffer an income loss equal to $(p^* - p^a) q^{*d}$. In other words the aggregate change in income for the exporting country would be equivalent to the area B+A+D+E, which he concluded was unambiguously higher than it had been before trade. By contrast, for the importing country B, producer income would fall by $p^b q^b - p^* q^*_s$, while consumers would enjoy an income gain of $(p^b - p^*) q^b$. The net effect would be a fall in aggregate income equivalent to the area d.

What is striking is how the same apparatus, one that yields the same positive results in terms of equilibrium prices, output, demand and trade flows, when manipulated by Cournot and by his neoclassical successors, gives rise to such different normative conclusions. For neoclassicals, trade is a positive sum game for both countries, whereas in Cournot's hands, the gain to the exporting country is greater and the importing country loses. So who is correct and how is the impartial observer meant to arbitrate between the two positions? And why has Cournot's interpretation faded from common view?

5 Why the neglect of Cournot's trade analysis?

Creedy points out that, despite the acknowledged importance of Cournot for Marshall, there is no mention of him in any of Marshall's published work on foreign trade, a lacuna that Cunygnhame did not remedy (Creedy, 1990, p. 100). Indeed, the general lack of awareness of Cournot's trade analysis is all the more remarkable, when one considers that it is his apparatus that is still in use today in all contemporary textbooks. One possible explanation for his neglect in this area is that his analysis is incorrect. This was the view of Bertil Ohlin who remarked "Cournot's work on international trade has attracted little attention, which is no doubt partly to be explained by the fact that his conclusions are on the whole erroneous"

(Ohlin, 1935, p. 563).[4] Ohlin admitted that he came late to the work and other than the aforementioned dismissal, he did not deign to explain in what way Cournot's trade theory was erroneous. However, accusing Cournot of logical errors is a disquieting position to adopt, given the high esteem in which he was held by succeeding generations of neoclassical economists, especially for his mathematical ability. One way out of the impasse is to accuse him of protectionist sentiment that overrode his analytical judgement. This was the position adopted by Charles Bastable, for whom the only explanation of why someone of Cournot's analytical power could have derived the conclusions that he did, had to be due to "bias against the free trade doctrine of Adam Smith and his followers" (Bastable, 1903, p. 175). Irving Fisher took an interesting stance. On the one hand he lauded Cournot's work, calling the book (*Mathematical Principles of the Theory of Wealth*) "an economic classic" whose reasoning and conclusion had yet to be superseded and he hailed Cournot as the founder of the mathematical school (Fisher, 1898, p. 120). But on the other hand he dismissed Cournot's analysis of the effects of trade. He blamed his erroneous conclusions partly on his "fallacious conception of income" (p.121) and also accused him of "gross carelessness" (p.129). So, for Fisher, Cournot's attempt to show that "a protective tariff may, under special circumstances increase the national income" can be safely dismissed since "the idea of income is so arbitrary and faulty" (p.132). He also pointed out in a footnote how "Cournot falls again into mathematical error" [5] So Cournot's trade theory has been neglected (in stark contrast to other parts of his work) because he is deemed to have erred, and the reasons given for his uncharacteristic errors are: ideological bias, which is said to have blunted his analytical powers; and carelessness, which Fisher, paradoxically attributed to Cournot's mathematical facility, which he maintains rendered him lazy when it came to checking results (p. 129).

6 Making sense of Cournot's trade theory

In this section I will re-evaluate Cournot's trade theory. In the course of this re-examination, I will consider some of the substantive criticisms leveled against it, including subsequent clarifications by Cournot. I will also attempt to show how it fits within the overall thesis of 1838 book, which was not just to theorise about issues in political economy, but to do so in a mathematical way. Key to understanding Cournot's approach is to realize that while he was attempting to develop a science of social physics (influenced as he was by the philosophy of Auguste Comte), which justified a mathematical approach to social phenomena, he was

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[4] This judgement on Cournot is contained in Appendix II of Ohlin's original edition of *Interregional and International Trade,* where Ohlin discusses some earlier theories of trade. The appendix is not contained in the revised 1967 edition of the book.

[5] To bolster his case that Cournot was careless, Fisher (p. 132, footnote) points to an error that Cournot made when working out the effects on national income of free trade when transport costs exist, and the profits from same accrue to agents in the importing country. Fisher is correct in his accusation. The effect of transportation profits accruing to agents in the importing country is to reduce the losses to the importing country (applying Cournot's model). However, the conclusion that Cournot reaches that such a reduction will turn losses into gains is not logically conclusive, in that it may or may not. However, this error by Cournot does not invalidate his general model on the effect of free trade on the importing country when transport costs are disregarded.

nevertheless cognizant that there were questions to which mathematical analysis cannot apply.

One early criticism leveled at Cournot was his use of nominal prices to evaluate changes in income. Bastable (1903, p. 174) raised this point, adding that since the value of money may vary between countries, this in itself is enough to render his results unsound. Edgeworth (1894, p. 630) dismissed this criticism on the grounds that Cournot's reasoning was as valid as that of Marshall who used nominal prices when discussing consumer rent. In any case, since this partial equilibrium diagram is used in neoclassical economics to show the normative effects of trade, the appropriateness or otherwise of using money prices as a measure of value is extraneous to explaining how an identical diagram with identical equilibrium outcomes can yield such different normative conclusions in the hands of Cournot and neoclassical theorists and practitioners. This we shall see is due to essential differences in how consumer welfare is interpreted and how markets are presumed to function. In the analysis that follows, reference is to the cases of Countries A and B as represented in Figure 2.

Cournot has been accused of inadequately addressing the effect of liberalisation on consumers' income (Viner, 1965 [1937], p. 588 and Gomes, 2003, pp. 93-94). This accusation overstates the case. Cournot does recognize the income losses to consumers who stay in the market but who must now pay a higher price in the exporting country (area C for consumers in country A) and the income gains to existing consumers in the importing country (areas Z+ b in country B). What he does not include are the presumed extra consumer income losses (gains) in the exporting (importing) country as a result of consumers exiting (entering) that particular market. This was not an oversight but a conscious decision that he acknowledges, "… we have not considered the loss experienced by that class of home consumers who stop buying the dearer commodity [in the exporting country], and who must make a use less to their liking of a part of their incomes" (Cournot, 1971 [1838], p. 154). Similarly, in the importing country "We do not consider … the advantages resulting to consumers … of the reduction … to use a part of their incomes more to their liking" (p. 156). His justification in both instances was that such consumer losses or gains were "not capable of measurement, and do not directly affect the national wealth in the commercial and mathematical sense of the term" (p. 154). This shortcoming in his analysis, if such it be, can be attributed to his theory of wealth and the scope of his method. For Cournot, wealth is "value in exchange" and, as such "susceptible of rigorous treatment" (p. 10), by which he means mathematical analysis. By contrast "utility [is something] which everyone estimates in his own way, because there is no fixed standard for the utility of things" (p. 11). Cournot does not deny that objects have utility, simply that a concept like utility is too variable and indeterminate, and as such not suited as the foundation of a scientific theory (p. 10).[6]

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[6] Cournot, who was the first economist to define and draw a demand curve, did so without invoking utility. For Cournot, observation was the basis for his conclusion that "the cheaper the article is, the greater ordinarily is the demand for it" (p. 46). He acknowledged that demand for a good was determined by, inter-alia, its utility, services rendered, enjoyment, habits of people, average wealth, distribution of wealth, but did not believe that these "moral causes " were capable of measurement, and, as such, they were not the basis for his conclusion that

The other major criticism of Cournot's analysis is his treatment of production and the impact of international trade on same. In the exporting country, producer income is held to increase by C+B+A+D+E. The inclusion of D+E as a gain to national income presupposes that the resources now employed in increased (real) production in this sector were previously idle. Similarly, his analysis of the impact of international trade on the importing country, whereby producer income is held to fall by Z+b+d and d is treated as a net loss to the country (since there is no commensurate offsetting consumer gain) implicitly assumes that the real resources released from the contracting import competing sector fail to find employment elsewhere in the economy.

One reading of this result is that it assumes that resources are immobile between sectors. This was the interpretation of early critics, such as Hagen, who rejected Cournot's conclusions on the grounds that the assumption of resource immobility was unwarranted. Viner refers to this explanation, but adds that Cournot himself denied in subsequent writings that he was assuming resource immobility (see Viner 1965 [1937], p. 587, footnote 7). Indeed, Angell did assert that Cournot starts with the fundamental idea that the mobility of productive resources in a given country is relatively slight, so that if an industry contracts due to imports, the wealth tied up in it is in large part lost. He also noted how this assumption was in direct contradiction to the perfect internal mobility assumed by classical economists, but said that it was latent throughout Cournot's analysis, thus [for him] explaining the failure of his critics to do him justice (Angell, 1926, p. 243). Like Viner, Theocaris also alleges that Cournot rejected the resource immobility claim, referring by way of evidence to Cournot's response to Hagen in his subsequent book *Principes,* where he says that he had taken account of this through his principle of "compensation of demands" (Theocaris, 1983, p. 196).

My understanding of what Cournot said in *Mathematical Principles of the Theory of Wealth*, is that employment of resources in other sectors of the economy does not change, **not** because of resource immobility, but rather because overall demand for their products remains unchanged. In page 166, Cournot raised the issue of whether resources employed in a sector find other employment, claiming that he had earlier replied to this objection (referring the reader to the earlier explanation) and, by giving an example designed to show the difference between his principles and those of the Adam Smith school, whom he believed to be in error. In the earlier explanation he dismissed this "specious objection [of presumed immobility of resource]" (p. 146) and instead asserted that what matters is whether "funds withdrawn from commodity A, to the demand for commodities B, C etc. [are] implicitly considered [in the estimation of the average result] … [the] neglect of which would have given rise to the objection we are endeavouring to refute" (Cournot, 1971 [1848], p. 148). In his subsequent example designed to show the difference between his thought and that of the Smith school, he stresses (albeit clumsily) that factor mobility is not the issue "this circumstance that for other agents and producers, other employments … may be substituted … - this circumstance, we

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demand is generally inversely related to price (p. 47). He even went so far as to acknowledge that there were species of goods where demand was positively related to price, but these were excluded from his analysis of the social economy on the ground of their empirical rarity (p. 46).

say, really has nothing to do with the question" (p. 169). Instead the issue is that if a country diverts expenditure to imports it "dispossesses itself … of the value" (p. 169) and "This value stops providing the income of certain French workers and producers" (p. 169).

This interpretation (lack of demand) of why resources released from the import competing sector fail to find alternative employment fits in with Cournot's discussion of Balance of Payments. While he explicitly says that what he is analysing is the effect of the removal of barriers for a particular commodity "What will be the effect of this removal of barriers which affects only a single commodity" (p. 162), he goes on to say that a quantity of a commodity cannot pass from A to B without having an equal value imported directly or in some roundabout way from B to A. But he is insistent that he has accounted for this by "the reduction in the total fund which home consumers could apply to the collective demand for commodities … other than [the imported commodity]" (p. 163). In terms of figure 2, this amounts to saying that, for country B, imports of d+e for in the particular market under investigation must be matched by exports of the same value elsewhere in the economy. This will be the case if output remains unchanged in other sectors but domestic demand for other goods falls by d+e (due to a fall in production d and switch in domestic consumption e), to be replaced by export demand. A similar reasoning can be applied to country A. It would also explain why, notwithstanding balanced trade, Cournot insists that the 2 countries are "not placed under symmetrical conditions" (p. 163).

The objective of the latter exegesis is not to say that all the assumptions that Cournot made were justifiable or sufficient, but rather to point out that his analysis did have an internal logic. Essentially, I am making the same point as Angell, for whom "the analysis [was] substantially valid" (Angell, 1926, p. 245), even if my explanation as to why resources do not find alternative employment is different. I would go further and tentatively contend that Cournot's analysis could even be seen as an imperfect precursor to Keynes, to the extent that he is assuming that employment of resources is a function of output and output a function of demand. To support this claim, I would add that Cournot essentially parodies the theoretical analysis of Jean Baptiste Say, whom he accuses of making gratuitous suppositions concerning the employment of home producers (Cournot, 1971 [1848], p. 169). This could be interpreted as a refutation of the notion that markets have an inbuilt tendency to full employment. It would also explain why, in the case of country A represented in Figure 2, the increase in output D+E is seen to add to national income, which could only be the case if output increased without drawing resources from other sectors. This would a reasonable conclusion for one who accepted (as arguably Cournot did) that unemployment can be a persistent and stable feature of economies. Interestingly, Theocaris, uses Cournot's response to Hagen's observation that an increase in production can only come about at the expense of other branches, where he acknowledges that "there may be circumstances where an industry will not be able to develop except at the expense of another" (cited in Theocaris, 1961, p. 196) as a concession on the part of Cournot. To me, this is not a ringing endorsement of the inevitability of full employment, merely a recognition that there may be circumstances where different sectors compete for scarce resources, not that this is invariably the case.

His treatment of balance of payments is also worthy of note insofar as he appears to be saying that while trade must be balanced, such balance does not require full employment, or indeed say anything about the constraints that production places on the balance of payments. A country's trade could balanced with increased production or with reduced production, as long as domestic consumption adjusts accordingly.

As to the general charge that Cournot's partial equilibrium approach to analysing the effect of trade is inadequate and that a general equilibrium approach is necessary, it is necessary to recall Cournot's justification for the deployment of mathematics and the representation of social phenomena in functional form. Cournot explicitly acknowledged that in deploying his partial equilibrium apparatus, he was treating "as given and invariable the prices of other commodities and the incomes of other producers" (Cournot, 1971 [1838], p. 127) and that this is at variance with the reality of market interdependence. However, he defended his approach and his failure to take the "entire system into consideration" on the grounds that "it would surpass the power of mathematical analysis and of our practical method of calculation" (p. 127). He was applying mathematical method to the parts of theory that he believed were susceptible to such treatment. He had in his introductory chapter asserted that theorising in political economy had failed to make progress either because "the relations which it had to deal with are not reducible to fixed terms, or because the relations are much too complicated for our powers of combination and analysis" (p. 16). It is difficult not to conclude that there was something rather prescient in this judgement, given the ubiquity of mathematical theorising in economics today, often yielding results of questionable value.

7 Making sense of neoclassical trade theory

As mentioned in earlier sections, contemporary neoclassical theory, when applying partial equilibrium tools to issues of trade, concludes that in particular markets, the gains from liberalisation include, inter-alia, the welfare triangles that are supposed to address consumption and production efficiency (areas A+B, in Figure 1 or A for country A and b+c for country B, in Figure 2). As we saw, Cournot ignored consumer surplus associated with increased or decreased demand in a market for the pragmatic reason that he thought it incapable of measurement. By contrast, neoclassical theory holds that those who enter (exit) a market increase (decrease) their overall utility by the amount of their consumer surplus in that particular market. This would only be true if such expenditure put to other uses reaps zero consumer surplus. Or, to put in another way, it is only accurate, according to neoclassical theory, if the demand curve is the compensated demand curve; that is to say, demand for a good holding utility constant. Given that estimated demand curves are at best approximations of uncompensated demand, it can be safely asserted that area c in Figure 2 (for country B) should be considered as an upper bound to changes in consumer surplus. Staying with the example represented in Figure 2, the area b is designated as production efficiency that accrues to the importing country. This is because, according to neoclassical theory, the area under the industry supply curve represents not just total cost of production but total value added foregone elsewhere in the economy as a result of employing resources in that

particular sector. The assumptions underpinning this interpretation are: price taking behaviour, market prices that approximate to social opportunity cost and constant employment. So when output contracts in the import competing sector (Country B, Figure 2), the value of output lost in that sector is judged to be d, but the output created elsewhere when resources get redeployed is deemed to be b+d. This results in a net production gain of b from the more efficient use of resources induced by international competition

8 Reconciling Cournot's theory and Neoclassical theory with market realities

Both Cournot's analysis and contemporary neoclassical use of Cournot's tools could be best regarded as limiting cases. Using contemporary language, Cournot's depiction of production presupposes that the opportunity cost of an activity is zero, whereas the neoclassical depiction presupposes that that all resources get paid their opportunity cost. A more realistic position would be to recognise that resources may have alternative uses, but that there is no a priori reason to assume that in their alternative use they would earn as much as in their current occupation, if employed at all. Indeed, it may be that the alternative to current employment is unemployment. In other words, a more realistic position would be to recognise that markets are imperfect and full employment is at best a desirable objective of economic policy, not a presumed outcome of the operation of unfettered markets. In a similar vein, new consumers attracted to a market by lower prices can be assumed to be enjoying increased net utility, certainly more than zero (as Cournot presumed for pragmatic reasons), but it is unlikely to be as large as neoclassical estimates of c (country B in figure 2), when for essentially equally pragmatic reasons, uncompensated demand curves are used to estimate changes in consumer surplus.

So when applying partial equilibrium tools to the real world, and treating Cournot's welfare analysis and neoclassical welfare analysis as limiting cases, we can see that there can be no presumption as to whether a country gains or not from trade. When looking at import markets, the net effect is intermediate to –d (resources find no alternative employment and no net consumer gains) and b+c (perfect markets pricing resources at their opportunity cost and negligible difference between uncompensated and compensated demand). So a priori we cannot say if the net effect is positive or negative. Empirical evidence is needed to decide the case. When looking at export markets, the conclusions are more benign, with net effects presumed positive in both analyses but probably intermediate to A (neoclassical position) and BADE (Cournot). It can be said that while neoclassical theory downplays the problems of production, Cournot's theory, with its emphasis on production and productive forces, reveals strongly mercantilist influences.

9 What can we learn from the neglect of Cournot in the domain of trade?

What this paper sought to do was to rehabilitate Cournot's trade theory on the grounds of its internal consistency. While acknowledging that his conclusions can only be justified on the

basis of strong, indeed extreme assumptions, I would assert that these assumptions are no more extreme than those invoked by neoclassical trade theorists when making the case for trade liberalization. Furthermore, neoclassical assumptions go further, in that they impart a positive bias to measurements of the effects of trade (the inbuilt assumption that the welfare triangles must represent unambiguous gains to countries).

The neglect of Cournot's trade theory cannot be attributed to its erroneous conclusions. Rather, it would not be too outlandish to suggest that its initial rejection by neoclassical economists was due to its uncomfortable implications for trade theory. Neoclassical theory has, by and large, been supportive of free trade. Alfred Marshall, whose influence cast such a long shadow over Cambridge, is alleged to have said that the man who refuses to support free trade could not be a bona fide professional economist (Coats, 1972, p. 488). During the tariff reform crisis of 1903, he lent his name and considerable authority to the free trade case, a measure designed not only to impact on a particular political problem but also to underline the specialised expertise of the economist when it came to economic issues. Keynes, at his own admission, was an ardent free trader in his youth and early middle age, as evidenced by this comment in the *Guardian* in 1923 "We must hold to Free Trade in its widest interpretation as an inflexible dogma, to which no exception is admitted, whenever the decision rests with us" (Keynes, 1923, p. 717). All of which serves as a warning not to dismiss the impact of ideological bias on theory, especially in the social sciences. That these biases are not often recognised by later practitioners can, in part, be explained by lack of historical awareness.

That Cournot's tools are still employed today (without attribution) reveals a certain opportunism in how neoclassical theory evolved. The desirable aspects of Cournot's tools were their mathematical expression, which sufficed to convince many neoclassical practitioners that their analysis was rigorous. The irony is that Cournot, while anxious to be rigorous and scientific, was also aware of the limited application of mathematical theorising in the social domain. That would explain the self-imposed limits in terms of the questions he addressed, and the extent to which he also allowed his theoretical speculations to be guided by what he deemed to be common sense.

In showing that both Cournot and neoclassical practitioners are internally consistent in their use of the same set of tools, I desire to highlight that theoretical rigour is not sufficient to ensure the relevance of a theory, especially one with policy implications. Empirical arbitration is necessary to adjudicate between competing theories.

Finally, this exercise has shown the benefits of knowing the historical evolution of thought, especially in the social sciences. For students to be able to arbitrate between different theoretical stances, especially in instances such as the one discussed in this paper where both sides use the same tools, it is first necessary to be aware that there is indeed more than one position. Such awareness can only lead to increased epistemological sensitivity as to how one establishes which theory gives a better representation of the causal forces at work in society.

References

Angell, J. (1926). The Theory of International Prices: History, Criticism and Restatement, Cambridge Massachussets: Harvard University Press.

Bastable, C. (1903). *The Theory of International Trade with some of its Applications to Economic Policy,* 4th edition, London: MacMillan and Co. Ltd.

Coats, A.W. (1972). The appointment of Pigou as Marshall's successor: Comment, *Journal of Law and Economics,* **15** (2), pp. 487-495

Cournot, A. (1971 [1838]). *Researches into the Mathematical Principles of the Theory of Wealth,* New York: Augustus Kelley (Reprints of Economic Classics).

Creedy, J. (1990). Marshall and International Trade, in: Whitaker, J.K. (ed). *Centenary Essays on Alfred Marshall,* Cambridge: Cambridge University Press.

Creedy, J. (1992). Cournot on Trade between Regions and the Transition from Partial to General Equilibrium Modelling, *History of Economics Review,* 18, pp. 10-19.

Cunyghame, H. (1903). The effect of export and import duties on price and production examined by the graphic method, *Economic Journal,* **13** (51), pp. 313-323.

Edgeworth, F. (1894). Theory of international values, *Economic Journal*, **4** (16), pp. 606-638.

Fisher, I. (1898). Cournot and mathematical economics, *Quarterly Journal of Economics,* **12** (2), pp. 119-138

Gomes, L. (2003). *The Economics and Ideology of Free Trade: An Historical Review,* Cheltenham: Edward Elgar.

Hertel, T. and Tsigas, M. (1997). Structure of GTAP, in: Hertel, T. (ed). *Global Trade Analysis: Modelling and Application,* Cambridge: Cambridge University Press.

Hufbauer, G. and Elliot, K. (1994). *Measuring the Costs of Protection in the United States,* Washington, D.C.: Institute for International Economics.

Keynes, J.M. (1923). The Underlying Principles, *Manchester Guardian Commercial Supplement* 717, pp. 717-718.

Messerlin, P. (2001). *Measuring the Costs of Protection in Europe: European Commercial Policy in the 2000s.* Washington, D.C.: Institute for International Economics.

Ohlin, B. (1935). *Interregional and International Trade,*: Harvard University Press.

Ohlin, B. (1967). *Interregional and International Trade,* (revised edition), London: Oxford University Press.

Theocaris, R. D. (1983), *Early Developments in Mathematical Economics,* 2nd edition, London and Basingstoke: Macmillan Press Ltd.

Vaggi, G. and Groenewegen, P. (2003). *A Concise History of Economic Thought: From Mercantalism to Monetarism*, London: Palgrave Macmillan.

Viner, J. (1965 [1937]). *Studies in the Theory of International Trade,* London: George Allen and Unwin Ltd.

Whitaker, J. ed. (1975). *The Early Writings of Alfred Marshall, 1867-1890, Volume 2,* London and Basingstoke: Macmillan Press Ltd.
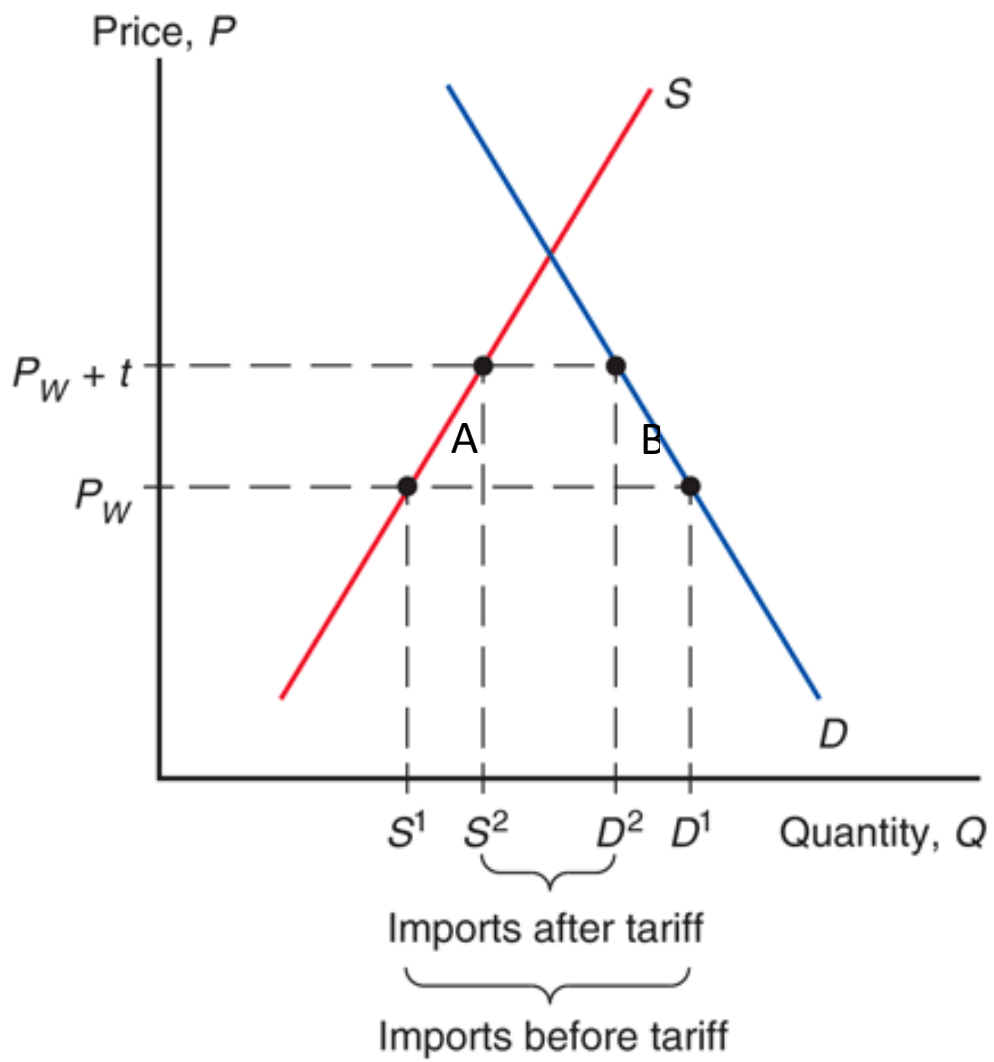
Figure 1

Figure 2

Country A

Country B