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Second Best redistributive policies: the case of international trade

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Abstract

The paper presents a brief review of recent work that focuses on the normative economics of international trade. In an Heckscher Ohlin - like economy, with skilled and unskilled workers, the available redistributive tools, (that include income taxation) are not powerful enough to allow the separation of efficiency and equity issues and "production efficiency" is no longer desirable. At a social optimum that calls for redistribution towards the unskilled workers, the social value of the unskilled intensive good is necessarily smaller than its production price. This finding allows to unify existing results and suggests conjectures.

Résumé :

Ce document présente une revue de travaux récents qui portent sur l'économie normative du commerce international. Dans une économie à la Heckscher-Ohlin, avec du travail qualifié et du travail non qualifié, les outils disponibles pour la redistribution, (qui incluent un impôt non linéaire sur le revenu) ne sont pas assez puissants pour permettre une certaine sèparation des considérations d'équité et d'efficacité et "l'efficacité de la production" n'est plus souhaitable. A un optimum social, qui appelle de la redistribution vers les travailleurs non qualifiés, la valeur sociale du bien intensif en travail non qualifié est nécessairement plus petite que son prix de production. Cette propriété de l'optimum permet d'unifier des résultats existants et suggère des conjectures.

1. Introduction.

This paper provides a brief presentation of recent research Naito (1996), (1998), Gabaix (1997a) (1997b), Guesnerie (1998) (see also Spector(1999),...,) that focuses on the normative economics of international trade, and in particular, on how both the efficiency and redistributional dimensions should properly be taken into account.

There is little doubt that the extension of international trade and the globalization of the economy is one of the striking facts of the end of the twentieth century[1]. The extent to which this globalization movement raises distributional issues in rich countries has been the subject of hot debates ((see on one side Krugman (1995) on the other Wood (1991) and also Rodrick(1995)).

Hopefully, the literature that is reviewed here already has shed some light on the debate and will continue to provide insights in the future. My primary purpose, however, is not to discuss the actual or potential contribution of the papers under review to on-going policy evaluation efforts, but to assess their message in the perspective of the theory of second best income redistribution. Some introductory remarks on this theory will help to clarify the objective.

For a long time, normative economic theory has kept a rather cautious and conservative approach to the problem of income redistribution. The "main theorem of welfare economics" asserts that the use of lump sum transfers allows the separation and reconciliation of efficiency and redistributional considerations. Indeed, in an international trade context, efficiency gains from trade can be redistributed with lump sum transfers that possibly compensate losers.

Modern normative economics, following the pioneering work in the seventies (Diamond-Mirrlees 1971, Mirrlees 1971), has recognized that actual tools of income redistribution only allowed the attainment of second best objectives. In light of early developments in incentive theory, it has been argued that the limitations of policy tools described in the optimal taxation literature did reflect some basic asymmetric information constraints (Hammond 1979, Guesnerie 1981).

If the second best (indirect or direct) taxation schemes are powerful enough, however (as they are in the Diamond-Mirrlees 1971 world), some separation between "equity" and "efficiency" persists. In particular, the analysis supports the conclusion that the "production sector" as a whole should remain efficient (this is

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[1]According to 0'Rourke and Williamson (1999), during the nineteenth century, the "Atlantic economy" had already experienced a globalisation movement that had profound effects on welfare and income distribution.

the "production efficiency" proposition of Diamond-Mirrlees). And, if the evoked tools are available in an international trade context, then efficiency gains due to the opening of borders can still be redistributed in a Pareto improving way (Dixit-Norman 1980, 1986).

It had been argued that the Diamond-Mirrlees model delineated a polar case of theoretical interest, but that the policy relevance of the conclusions, and in particular of the production efficiency recommendation, had to be carefully assessed in view of the possible discrepancies between the actually available taxation tools and the Diamond-Mirlees's assumptions (see, for example, Guesnerie 1979). However, Atkinson-Stiglitz (1976)'s result, showing conditions under which a single non linear income tax schedule would outperform the complex optimal scheme that obtains under purely linear indirect taxation, and still guarantee production efficiency, mitigated the initial reservation. But the field of validity of Atkinson-Stiglitz' result was often overestimated. In fact, production efficiency is likely to fail, not only when, in a linear taxation context, the consumption price vector cannot be completely disconnected from the production price vector, but also when the different factors of production, that are not perfect substitutes, cannot be subject to different non linear schedules[2].

Hence, misleading perceptions may have inhibited research on the analysis of the discrepancies between "social values of commodities" and market prices that necessarily occur when production efficiency is no longer desirable (see Guesnerie 1996, chap.5, for a discussion of the issue and presentation of some results).

The paper will describe models of international trade in which the conditions of production, together with limitations of redistributive tools beyond what Dixit-Norman (1986) assumed, lead to a failure of production efficiency. The point of the paper is to investigate the nature of the discrepancy between prices and social values; it will show how its understanding is crucial to the analysis of the interplay between efficiency and equity.

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[2]The (non mysterious) point that Atkinson-Stiglitz no longer hold in this context, has been stressed recently. In a model with two factors of production, as the one that will be considered here, Naito (1999) shows that a single optimal tax schedule has to be supplemented with commodity taxes; it is also the case, and will almost always be the case with one missing dimension of taxation, that production efficiency is no longer desirable.

2. The model and the key argument.

2.1. Modeling options.

One of the simplifying assumptions of the optimal nonlinear income tax literature, à la Mirrlees, is that different qualities (types) of labor are perfect substitutes in production[3]. Following Stiglitz (1982), a number of recent studies have given up the perfect substitute assumption and introduced imperfectly substitutable categories of labor. For example, Piketty (1997), reflecting current policy debates, distinguishes between skilled and unskilled labor. In the same spirit, Naito (1996) introduces a two-factor economy which eschews the traditional capital-labor dichotomy of a Heckscher-Ohlin economy and instead uses skilled and unskilled labor as the two factors of production.

In two recent papers, Guesnerie (1998) and Naito (1998) restrict attention to a constant returns to scale economy à la Heckscher-Ohlin where these two types of labor serve two produce two goods[4]. For the sake of illustration, let us call the first good, which is supposed to unskilled labor intensive, textiles, and the second good, which is supposed to be skilled labor intensive, electronics.

Calling w_u and w_s, the unskilled and skilled labor wage, we know that, with constant returns to scale, the competitive price vector $p = \{p_1, p_2\}$, can be written:

$$p = \Phi(w_u, w_s) \tag{2.1}$$

If there is no intensity reversal, we know that "factor price equalization theorem" holds, Φ is invertible and:

$$w = \Phi^{-1}(p) \tag{2.2}$$

Following Stiglitz (1982), assume that the government can observe income but is unable to ascertain whether income comes from skilled or unskilled labor. Call L_u (resp. L_s) the time spent working by unskilled (resp. skilled) agents which is assumed to be the same across similarly skilled workers. The incentive constraints

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[3]This assumption is not made in the Diamond-Mirrlees model.

[4]The model considered by Gabaix (1997a,b) considers a general production set that is supposed to be affected in a complex way by technical progress. His discussion of trade, viewed as a special form of technical progress, does not necessarily have an explicit counterpart in the present setting. A related model considered by Spector (1999) is a special case of the one discussed here. In this case, the production of each good uses only one factor and preferences are homothetic

associated with an income tax schedule in which the post-tax incomes associated with pre-tax incomes $w_u L_u$ and $w_s L_s$ are denoted R_u and R_s , and which makes the skilled indifferent between behaving as a skilled agent or pretending to be not skilled is:

$$V(., R_s , L_s) \geq V(., R_u, (w_u L_u)/w_s). \qquad (2.3)$$

In this case, V( )is a (not fully specified) indirect utility function that depends on post tax income and labor time. This takes into account that a skilled agent can mimic an unskilled one by working $(w_u L_u)/w_s$ hours and getting the income R_u.

Note that if one wished to alleviate this constraint, (for example, because one wishes to increease the post tax income and then the welfare of the unskilled), it could be done, all other things equal, by *increasing* w_u. This makes it more difficult for the skilled to mimic the unskilled since, everything equal, it would require more work. Naturally, distributional considerations may justify to increase w_u in contexts different from the one just suggested : for example, with a linear income tax, or with limited commodity taxation.

Let us now consider the social welfare optimum, when this economy is in autarky. We need to introduce a social welfare function. To be concrete, let us choose a utilitarian welfare fuction of the form:

$$\alpha_u V(., R_u , L_u) + \alpha_s V(., R_s, L_s). \qquad (2.4)$$

Assuming, for the sake of simplicity, that the utility function is separable with respect to labor, the demand from the consumers is of the form :

$$d_u(., R_u) + d_s(., R_s)$$

where d_u, d_s are respectively the demand for goods, (a vector in R^2) coming from the skilled and the unskilled agents.

Supply is competitive supply associated with the labor vector $\{L_u, L_s\}$ and the price vector p : it is denoted $\eta(p, L_u, L_s)$ (again a vector of R^2) so that the market clearing equation is:

$$d_u(., R_u) + d_s(., R_s) \leq \eta(p, L_u, L_s) \qquad (2.5)$$

The second best optimization problem, when the country is in autarky, is then:

$$Max(2.4) subject to (2.1) or (2.2), (2.3), (2.5)$$

We call the solution to this problem the *autarky optimum*[5].

In the case of open borders, if the country is small so that the world price vector, denoted $\overline{p}$, is unaffected by trade, the optimization program is modified by incorporating the trade balance equation:

$$\overline{p}.y = 0, \tag{2.6}$$

(where y is the vector of trade) and modifying the market clearing equation:

$$d_u(., R_u) + d_s(., R_s) \leq \eta(p, L_u, L_s) + y \tag{2.7}$$

The second best optimization problem is then :

$$Max (2.4) Subject to (2.1) or (2.2), (2.3), (2.6)(2.7).$$

We call the soultion to this problem the *trade optimum.*

It should be noticed that since program disconnects the internal production prices from the world prices, it implicitly allows the use of tools like tariffs. This distinguishes it from the *laissez-faire optimum* in which redistribution policies are allowed but *internal production prices have to be equal to world prices.*

Finally we consider the *restricted trade optimum* associated with the following constraint on trade :

$$\|y\| \leq \epsilon$$

where $\|\|$ designates some norm.

2.2. An intuitive derivation of the argument :

Let me now sketch an argument, that reproduces the formal step of my 1998 paper, and that will serve to provide a partial unification of the different results under review here.

Assume that we are at some optimum, denoted * when needed. Assume that, at this optimum, it would be desirable, according to the welfare criterion, to transfer

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[5]In the case where the Government can use commodity taxes so that the consumption price vector, denoted π, can be freely disconnected from the production price vector, the program can be made fully explicit :

Max $\{\alpha_u V(\pi, R_u, L_u) + \alpha_s V(\pi, R_s, L_s)\}$.

$p = \Phi(w_u, w_s)$ or $w = \Phi^{-1}(p)$

$d_u(\pi, R_u) + d_s(\pi, R_s) \leq \eta(p, L_u, L_s)$

$V(\pi, R_s, L_s) \geq V(\pi, R_u, (w_u L_u)/L_s)$.

one unit of income from the skilled worker to the unskilled worker, but that here *the incentives constraint is strictly binding* (the Lagrange multiplier is strictly positive). Let us say in this case that the social optimum calls for *redistribution towards the unskilled (RTU)*.

Taking good 2 as the numeraire, ($p_2 = 1$), consider the following change, referred to as C :

(C) : $dw_u > 0, dw_s < 0$, s.t $dp_2 = 0$.

Stolper-Samuelson tells us that (C) involves a positive increase of dp_1 and, vice versa, an increase in p_1 involves an increase in w_u. It is this theorem that underlies the welfare analysis presented here : increasing the price of textiles is always a way to improve the welfare of the unskilled.

Consider the change (C) and suppose that, as it is the case in the model of footnote 5, it only affects η in the market clearing constraint and constraint (2.3) : we record this fact as "minimal effectivity". What are the social costs and benefits of the change (C), evaluated on the margin, at the optimum ?

Let us call $\rho = \{\rho_1, \rho_2\}$, the Lagrange multipliers associated with the scarcity constraints, and interpret them as the social values of commodities[6]. The "social benefit" associated with the change has necessarily two terms :

i) $(\rho_1, \rho_2) \begin{pmatrix} \partial\eta_1/\partial p_1 \\ \partial\eta_2/\partial p_1 \end{pmatrix} dp_1$, and

ii) as analysed in Section 2.1), the incentives benefit of increasing w_u and decreasing w_s.

Because the sum must be zero, (at the optimum), the first term must be negative. But the first term can also be rewritten. Induce a normalization of the vector of social values of commodities $\rho_2 = 1$, (after multiplication of the two terms), and take into account the standard properties of competitive supply, then rewrite the first term as :

$$(\rho_1 - p_1)(\partial\eta_1/\partial p_1)dp_1 = 0.$$

The two last terms in this expression are positive, so this implies :

$$(\rho_1 - p_1) < 0 \tag{2.8}$$

This is the key insight, let me state it as the *Preparation Lemma* :

Preparation Lemma : (Guesnerie 1998) *Consider an optimum that calls for RTU and in which the price change (C) has minimal effectivity, then, the*

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[6]See Guesnerie (1979) for a discussion of this usual treatment.

social value of the unskilled intensive good is necessarily strictly smaller than its production price.

The preparation Lemma, initially derived for the autarky optimum, holds true for the trade or restricted trade optimum[7]. It is enough that the Government can disconnect production prices from consumption prices through commodity taxation, and/or, as in the trade optimum, internal production prices from world prices, through tariffs or subsidies

Also,as the inspection of the argument suggests, the statement can be generalised :

i) The RTU condition is needed in order to imply that an increase in w_u is desirable : as argued above, this occurs with a non linear income tax but also when the redistribution tools are less powerful.

ii) The minimal effectivity condition can be significantly relaxed. For example, the Lemma remains true, if one assumes, as in Spector 1999, that production prices equal consumption prices[8].

2.3. A few consequences.

A number of results follow from the above Preparation Lemma. They will be stated somewhat informally as Results or Conjectures, I will use R for a (sufficiently) precise statements, and RC for, more or less well specified, conjectures.

R1: (Guesnerie 1998)

When the autarky optimum calls for RTU, if the world price of the unskilled intensive good is higher than a limit price that is strictly smaller than the autarky price, then opening the borders and allowing small trade involving the export of the unskilled intensive good is socially beneficial[9]. This is true in particular if the world price equals the autarky price.

In Guesnerie (1998), this is proven within the framework of the model made explicit in footnote 2, but as argued above, the statement would hold true with a

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[7]However, it will generally fail for the laissez faire optimum.

[8]Then, in the argument $(\rho_1, \rho_2) \begin{pmatrix} \partial\eta_1/\partial p_1 \\ \partial\eta_2/\partial p_1 \end{pmatrix} dp_1$ has to be replaced by $(\rho_1, \rho_2)(\begin{pmatrix} \partial\eta_1/\partial p_1 \\ \partial\eta_2/\partial p_1 \end{pmatrix} - \begin{pmatrix} \partial d_1/\partial p_1 \\ \partial d_2/\partial p_1 \end{pmatrix})dp_1$ and the conclusion follows using standard facts of demand theory.

[9]Along the line of Naito(1998), one might prefer to replace "socially beneficial" by "Pareto-improving". It is left to the reader to appreciate when the change is legitimate.

number of alternative assumptions, including, as stressed in footnote 8, those of the model à la Spector mentioned above.

The economics of the proposition may look, at first, surprising : for a range of world prices, the world price of textile being smaller than the autarky price, it is still desirable, at the margin, to export textile. Indeed, importing textile would determine efficiency gains of second order, when exporting it leads to second order efficiency losses and first order distributional gains.

Next statement is a conjecture that transforms, in a somewhat imprecise way, the local findings of R1, into global ones (at least when the world prices are not far from the autarky prices).

RC2 : *If the motive of redistribution towards the unskilled is strong enough, and if the world prices of commodities equal the autarky prices, then, for a large class of preferences, the trade optimum involves exporting the unskilled intensive good.*

This statement is in the spirit of the second part of Proposition 2 of Spector (1999) who draws the conclusion stated in RC2, in an economy with no commodity tax and identical homothetic preferences, but for a laissez-faire optimum.

I sketch the proof, using the Preparation Lemma, for the economy considered by Spector[10].

Suppose that at the trade optimum, textile is imported. Note, that it is straightforward, and well known from the general theory, (see for example Guesnerie (1995), chap. 5) that the social values of commodities is (proportional to) $\overline{p}$. Hence, $\rho_1 = \overline{p}_1$. But, with the preferences under consideration, the reader will convince himself that necessarily p_1 is strictly smaller than $\overline{p}_1$. But then, $(\rho_1 - p_1) > 0$, a fact that contradicts RTU. Now RTU is here a consequence of the fact that the preferences for redistribution towards the unskilled are strong enough[11].

One may guess, at least from the above proof that the conclusion requires some limitation on the use of commodity taxation, but this is an open question.

R3 : (Naito 1998) : *If the laissez faire optimum calls for RTU, then, appropriate tariffs, and/or trade subsidies or taxes, will improve social welfare.*

Again, I derive the statement, proved by Naito within a model close to the one of footnote 2, from the preparation lemma : as argued above, the statement

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[10] Again, the statement is here for a trade optimum and does not imply Spector result.

[11] The fact that the preferences for redistribution towards the unskilled are strong enough, obtains in particular with a Rawlsian welfare function supposed to always pick up the unskilled as the worst off,

is then also valid under a broader class of assumptions on redistributive tools.

The proof is as follows. Again, we note that that the vector of social values of commodities associated with the trade optimum is (proportional to) $\overline{p}$. Now, the trade optimum coincides with the laissez faire optimum, only if the optimal p_1 equals $\overline{p}_1$. But this contradicts (2.8) which holds if the optimum calls for RTU. QED

Both the economics and the intuition of R3 have the same flavour as those of R1 : Using tariffs or export subsidies helps the poor "unskilled"; this reflects the fact that at the margin of the laissez faire optimum, distorsions have second order efficiency costs and first order distributional gains.

R4 tells that, however trade is always desirable : it is entirely straigthforward in the model of footnote 2, for example.

R4 : *The trade optimum is socially better than the autarky optimum.*

Here, trade is socially beneficial, but this conclusion requires that "protectionnists" tools like tariffs be availaible and possibly used. It has been argued by Gabaix (1997a,b) and Guesnerie (1998) that the laissez-faire optimum might be inferior to the autarky optimum. Spector (1999) shows that this occurs in his model for a connected range of values of the world price of textile, in a whole region below the the autarky price.

RC5 : *For some values of the world price of textile, the laissez faire optimum is below the autarky optimum.*

This is a conjecture, the discussion of which goes beyond the scope of this essay. It is interesting to know what makes it true :iIn the class of models considered here, the conclusion is likely to require, at least, specific preferences.

3. Conclusion.

Allow me to conclude with a few thoughts:

It is obvious that one should be cautious in applying these results to policy matters. Here are at least three reasons :

- First, the results have been established in simple models and the robustness of the conclusions has to be ascertained within more satisfactory models. My forthcoming work with Ekeland (Ekeland-Guesnerie 2000) aims at providing better tools for assessing the connections between factor prices and commodity prices, with more generality.

- Second, in spite of disagreements on the relative contribution of Heckscher Ohlin effects and of technical progress to the contemporary evolution of relative

wages of skilled and unskilled labor, the role of technical progress, which was not included here, is certainly important and of high policy relevance.

- Third, there is a political economy component in the use of tariffs that is entirely absent here, although it obviously should not be ignored in the discussion of policy.

However, the line of research presented improves our theoretical understanding of second best income redistribution and, I hope, presents arguments that are relevant for a fuller understanding of international trade issues.

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