Inequality and Trade: A Behavioral Economics and Social Psychology Perspective*

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August 22, 2016

Abstract

In this note, based on recent insights from behavioral economics and social psychology, we present a simple theory to analyze trade between 'similar' countries by focusing on the role of income distribution. Specifically, by constructing a 'behavioral' version of the Heckscher-Ohlin model, we examine how differences in preexisting levels of income inequality across countries may determine the pattern of international trade in absence of any supply side differences when individuals have status-dependent preferences that are non-homothetic. We show that there exists a critical level of income inequality such that the specificities of the trade pattern that emerge between them are contingent upon whether the levels of income inequality prevailing in the countries are above or below this level.

Keywords: Behavioral Economics; Heckscher-Ohlin Model, Inequality, Non-homothetic preference, Social Status, Trade pattern.

JEL Classification: F11, Z13.

*We gratefully acknowledge the financial support provided by the Centre for Training and Research in Public Finance and Policy, India and RBI endowment at the Centre for Studies in Social Sciences, India. We are grateful to James Lake and Daniel Millimet for helpful discussions and comments. All remaining errors are our own.

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1 Introduction

Classical and neoclassical trade theory posits differences in relative factor endowments across countries as the basis of international trade. Empirical studies, however, reveal that the bulk of world trade takes place between 'similar' countries, i. e., countries that virtually have no supply side differences. This has been noted by Krugman (1981), Grossman and Maggi (2010), Grossman and Rossi-Hansberg (2013) and Caron et al. (2014) among many others. In this note, based on recent insights from behavioral economics and social psychology, we develop a simple theory to explain trade between countries with identical factor endowments by focusing on the role of income distribution. Specifically, by constructing a 'behavioral' version of the Heckscher-Ohlin model involving two countries, two factors of production - capital and labor, and two goods - a status good (a good whose consumption is, at least, partly driven by the prestige or status value associated with it (e.g., branded clothing)) and a non-status good (a good which has no status value (e.g., non-branded clothing)), we show how differences in preexisting levels of income inequality across countries may potentially determine the pattern of international trade when individuals have *status*-dependent preferences that are non-homothetic.

Previous literature that seek to explain trade between similar countries emphasize either on increasing returns to scale and product differentiation (Krugman, 1979, 1981; Helpman, 1981) or on technological differences across countries (Davies, 1995, 1997; Davies and Weinstein, 2008)). These papers assume preferences to be strictly homothetic and focus solely on the production side of general equilibrium models. This, however, seems to be inconsistent with empirical findings of Thursby (1987), Hunter and Markusen (1988) and Tchamourliyski (2002), all of which provide compelling evidence that tastes deviate from homotheticity in a statistically significant way. The papers that systematically incorporate non-homotheticity in preferences to offer a strictly demand-side explanation for a range of phenomenon like home bias in consumption, the mystery of missing trade and volume of trade include Markusen (1986, 2013), Hunter and Markusen (1988), Hunter (1991), Mitra and Trindade (2005), Reimer and Hertel (2010), and Caron et al. (2014) among a few others. Of these, although a few have looked at the role of income distribution in international trade (e.g., Mitra and Trindade, 2005), none have specifically explored the link between inequality and trade involving status goods from a 'behavioral' perspective, as we do in this note.[1]

[1]The only paper that we are aware of which looks at trade in status goods is Grossman and Shapiro (1988). However, the issue that they are concerned with is foreign counterfeiting of such goods which is not even remotely connected to this note.

2 The Model

2.1 Setup

There are two goods, a status good (S) and a non-status good (N). There are also two factors of production, capital ($\overline{K}$) and labor ($\overline{L}$). We assume that production functions for S and N exhibit constant returns to scale. Further, we assume that the S is a capital intensive good and there are no factor intensity reversals. Also, we assume perfect competition in all markets.

Individuals (indexed by subscript i) in our framework care not only about absolute consumption of the two goods but are also concerned about their *social status*, which is now widely recognized by behavioral scientists as one of the key motivations of human behavior (see for e.g., Weiss and Fershtmen, 1998; Tryuts, 2010; Heffetz and Frank, 2011) as social status confers psychological rewards like self esteem (Berger et al., 1972) and sense of power (Rucker and Galinsky, 2008). Following Clark et al. (2007), we define social status of an individual i (Λ_i) as the income of the individual (y_i) relative to the average income of the society ($\overline{y}$). That is,

$$\Lambda_i = \frac{y_i}{\overline{y}} \tag{1}$$

Clearly, higher (lower) is the individual's income relative to the average income, greater (lesser) is her social status.

To formally characterize the behavior of individuals in our setup, we invoke two axioms based on recent insights from behavioral economics and social psychology. Our first axiom describes precisely how concern for social status is likely to affect wellbeing of individuals. Towards that end, we start by noting recent empirical findings that suggest that an increase in status does not result in an 'equal' increase in wellbeing of all individuals across the income distribution. Specifically, Ferrer-i-Carbonell (2005, p. 1015) based on her analysis of German micropanel find robust evidence that, "poorer individuals' well-being is negatively influenced by the fact that their income is lower than that of their reference group, while richer individuals do not get happier from having an income above the average." Similar findings have also been reported by Blanchflower and Oswald (2004) and Clark and Senik (2010). These findings are in congruence with the predictions of Duesenberry (1949), Hollander (2001), and Frank (1985a,b) that income comparisons are asymmetric and upwards, and seem to suggest that the psychological rewards that status confers is important for wellbeing of those who belong to the lower end of the social ladder, but not important for those who belong to the higher end. This leads to our first axiom:

Axiom 1 *'Falling behind' hurts. That is, having income below the average level in a society reduces individual utility but having income above the average does not matter.*

Our next axiom has to do with individuals' specific motivation of consuming status goods. In a recent paper, Sivanathan and Petit (2010) note that, since lack of status psychologically hurts those who 'fall behind' and may induce chronic 'self-threat' among them, these individuals are likely to seek indirect opportunities to compensate for the loss in happiness and restore their global self worth. They hypothesize that one indirect route through which the individuals who fall behind attempt to restore self-worth could be by consuming status infused goods. The argument is that given the intimate connection between *self* and *possessions* (Beggan, 1992), consumption of status goods can potentially serve as an indirect source of self-affirmation for wounded egos (i.e., those who are psychologically hurt from not being able to keep up with the rest). In order to test this hypothesis, Sivanathan and Petit (2010) carry out a series of experiments in the laboratory and field. Strikingly, they find strong evidence in favor of their hypothesis. Specifically, they find that threatened individuals seek out status goods to soothe their psychological pain and that consumption of such goods is, at least partially, motivated by their bruised self esteem.[2] Thus, we have our second axiom as follows:

Axiom 2 *'Falling behind' increases the marginal rate of substitution for the status to non-status goods. In other words, people with lower than average income are willing to give up more of the non-status good to consume an extra unit of the status good.*

Based on the above axioms we devise the following utility function to represent the preferences of a representative individual i:

$$U(N_i, S_i, \Lambda_i) = f(\Lambda_i)\left[\log N_i + \phi(\Lambda_i)\log S_i\right] \tag{2}$$

where
$f(\Lambda_i)\begin{cases} = 1 \text{ if } \Lambda_i \geq 1 \\ < 1 \text{ if } \Lambda_i < 1 \end{cases}$
$f'(\Lambda_i) > 0$ (follows from Axiom 1), and
$\phi(\Lambda_i)\begin{cases} = 1 \text{ if } \Lambda_i \geq 1 \\ > 1 \text{ if } \Lambda_i < 1 \end{cases}$
$\phi'(\Lambda_i) < 0$ (follows from Axiom 2).
For obtaining analytical results we shall assume for $\Lambda_i < 1$, $f(\Lambda_i) = \Lambda_i$ and $\phi(\Lambda_i) = 1/\Lambda_i$.[3]

[2] Note that this explanation of status consumption is an alterantive to the 'wealth signaling' explanantion of this phenomenon (see for e.g., Bagwell and Bernheim, 1996).

[3] In Appendix A we rigorously show how the restrictions on the f and ϕ functions ensure that 'falling behind' hurts. Also note that, instead of a log-linear type utility function, one could use a CES type utility function to represent the preferences of individuals in our model (see for e.g., Marjit et al., 2015).

Note that the utility function that we have developed is non-homothetic as long as income inequality is non-zero.

We assume that the economy consists of two homogenous groups of people, each of mass one: the rich and the poor (from here onwards, the superscripts R and P will denote the two income groups respectively). The shares of of R and P in the economy's labor and capital stock are σ and $1-\sigma$ respectively with $\sigma \in [1/2, 1]$. Thus, incomes of the groups R and P are respectively given by

$$y^R = \sigma(w\overline{L} + r\overline{K}),\ y^P = (1-\sigma)(w\overline{L} + r\overline{K}) \tag{3}$$

where w denotes wage or the returns to labor and r denotes the rental price or returns to capital. Note that income inequality increases with σ. If $\sigma = 1/2$, there is perfect income equality. If $\sigma = 1$, there is perfect income inequality.

Assuming that the non-status good is the numeraire good and letting p denote the price of the status good, utility maximization subject to individual income constraints (where the incomes are determined based on the given endowments of labor and capital stock) yield the demand functions for the two income groups for the status good as

$$S^R(\sigma, w, \overline{L}, r, \overline{K}, p) = \frac{\sigma(w\overline{L} + r\overline{K})}{2p} \tag{4}$$

$$S^P(\sigma, w, \overline{L}, r, \overline{K}, p) = \frac{(1-\sigma)(w\overline{L} + r\overline{K})}{p\left[1 + 2(1-\sigma)\right]} \tag{5}$$

where S^j denotes equilibrium consumptions of the status good by a typical individual belonging to group $j = R, P$. Consequently, aggregate equilibrium consumption of the status good is given by

$$\widetilde{S}(\sigma, w, \overline{L}, r, \overline{K}, p) = \frac{\sigma(w\overline{L} + r\overline{K})}{2p} + \frac{(1-\sigma)(w\overline{L} + r\overline{K})}{p\left[1 + 2(1-\sigma)\right]} \tag{6}$$

The individual and aggregate non-status consumption can also be derived in exactly the same way. Next, we characterize the closed economy equilibrium.

2.2 Autarky Equilibrium

We start off our equilibrium analysis of a closed economy by discussing two important properties of aggregate status consumption. These properties, as we shall show, will be instrumental in determining the pattern of trade in an open economy setting.

First, we shall consider the impact of a ceteris paribus increase in inequality on aggregate demand for status goods. The aggregate status consumption in a closed economy is given by equation (6). Consider the impact of a one unit change in inequality on the aggregate status consumption. This is given by

$$\frac{\partial \widetilde{S}(\sigma, w, \overline{L}, r, \overline{K}, p)}{\partial \sigma} = \frac{w\overline{L} + r\overline{K}}{2p} - \frac{w\overline{L} + r\overline{K}}{p\left[1 + 2(1-\sigma)\right]^2} \tag{7}$$

$$= \frac{w\overline{L} + r\overline{K}}{p}\left\{\frac{1}{2} - \frac{1}{\left[1 + 2(1-\sigma)\right]^2}\right\} \tag{8}$$

Equation (8) clearly shows that the impact of inequality on aggregate status consumption in a closed economy is not unambiguous. More precisely,

$$\frac{\partial \widetilde{S}(\sigma, w, \overline{L}, r, \overline{K}, p)}{\partial \sigma} \gtreqless 0 \tag{9}$$

$$\Longleftrightarrow \frac{1}{2}\left[1 + 2(1-\sigma)\right]^2 - 1 \gtreqless 0 \tag{10}$$

Lemma 1 establishes this property of the aggregate status consumption.

Lemma 1 *At any given price, total consumption of status goods initially increases, reaches a maximum and thereafter decreases with an increase in inequality.*

Proof. It is easy to see that given $\sigma \in [1/2, 1]$,

$$\frac{1}{2}\left[1 + 2(1-\sigma)\right]^2 - 1 = 0 \tag{11}$$

$$\Rightarrow \ \sigma = \frac{3 - \sqrt{2}}{2} \tag{12}$$

Thus from discussion above,

$$\frac{\partial \widetilde{S}(\sigma, w, \overline{L}, r, \overline{K}, p)}{\partial \sigma} \begin{cases} > 0 \text{ if } \sigma \in \left[\frac{1}{2}, \frac{3-\sqrt{2}}{2}\right) \\ = 0 \text{ if } \sigma = \frac{3-\sqrt{2}}{2} \\ < 0 \text{ if } \sigma \in \left(\frac{3-\sqrt{2}}{2}, 1\right] \end{cases} \tag{13}$$

■

The intuition behind the previous lemma can be explained simply as follows. The specific way in which we have modeled the non-homothetic individual preferences implies that in a

society where we have two homogeneous income classes, poor (those having income below the societal average income) and rich (those having income more than or equal to the average societal income), and where the poor are 'not-so-poor', transferring some income from the rich to the poor will cause the poor to increase their spending on status goods (and rich to decrease their spending on such goods), but this increase would be small compared to the case where the poor are 'very poor' and the same amount of income is transferred from the rich to the poor. This is because the farther away the poor are from the average, the more 'unhappier' they are and hence the 'very poor' are likely to spend more resources in 'soothing' their psychological pain of relative deprivation compared to the 'not-so-poor'. Consequently, when the poor are 'not-so-poor' ('very poor'), it is likely that the decrease in status consumption of the rich outweighs (is outweighed by) the increase in status consumption of the poor. In other words, when the level of preexisting inequality is low (high), a fall in inequality will cause aggregate status consumption to fall (rise). This, in turn, produces an inverted U-shaped relation between aggregate status consumption and inequality as depicted in Figure 1.

Next, we discuss the relation between aggregate demand for status good and its price. Suppose there is an increase in price of status goods. In our framework, apart from price affecting demand for the status good via the standard substitution and income effects, it influences demand for the status good through two additional channels. First, price changes the factor prices and this in turn affects income of the two groups of consumers. This is the additional income effect that arises due to our assumption of an ownership structure for the factors of production. Second, price impacts the relative income which in turn has implications for status effects via the function $\phi(.)$. This effect however is limited for poor income group. Given these additional ways through which price influences aggregate status consumption, the relation between price and demand for the status good is not unambiguous in our model. However, the following lemma establishes the sufficient condition which has to hold for price to have a negative impact on status consumption in our framework.

Lemma 2 *For any price p and income y^j, suppose that the following condition holds: $[(p/y^j)(\partial y^j/\partial p)] < 1$ $(j = R, P)$. Then, aggregate demand for status goods decreases with the price of status goods; that is, $d\widetilde{S}/dp < 0$.*

Proof. Since $S^R = \frac{\sigma(w\overline{L}+r\overline{K})}{2p}$,

$$\frac{dS^R}{dp} = \frac{1}{2}\left[\frac{1}{p}\frac{\partial\sigma(w\overline{L}+r\overline{K})}{\partial p} - \frac{\sigma(w\overline{L}+r\overline{K})}{p^2}\right] \tag{14}$$

Substituting $y^R = \sigma(w\overline{L} + r\overline{K})$,we get

$$\frac{dS^R}{dp} = \frac{1}{2}\left[\frac{1}{p}\frac{\partial y^R}{\partial p} - \frac{y^R}{p^2}\right] \tag{15}$$

Thus,

$$\frac{p}{y^R}\frac{\partial y^R}{\partial p} < 1 \Rightarrow \frac{dS^R}{dp} < 0. \tag{16}$$

Similarly, one can show that if

$$\frac{p}{y^P}\frac{\partial y^P}{\partial p} < 1 \Rightarrow \frac{dS^P}{dp} < 0. \tag{17}$$

Thus, when $\frac{p}{y^j}\frac{\partial y^j}{\partial p} < 1$ for $j = R, P$, it must be that

$$\frac{d\widetilde{S}^P}{dp} = \frac{dS^R}{dp} + \frac{dS^P}{dp} < 0. \tag{18}$$

■

Now suppose that there are two countries: Country 1 and Country 2. To start with assume that Country 1 has a more equal income distribution than Country 2, i. e., $\sigma^1 < \sigma^2$ (where the superscript indexes the two countries respectively). Note that, the two countries do not differ in terms of factor endowments or technology. As such the supply curve for the status (and non-status good) that each country faces is the same. Assuming that the sufficient condition given by lemma 2 holds, each country faces a downward sloping aggregate demand curve.

Since $d\widetilde{S}/d\sigma > (<)0$ for $\sigma < (>)(3-\sqrt{2})/2$, Country 2 faces a higher demand curve relative to Country 1 if $\sigma^1 < \sigma^2 < (3-\sqrt{2})/2$ and Country 1 faces a higher demand curve relative to Country 2 if $(3-\sqrt{2})/2 < \sigma^1 < \sigma^2$. Thus, in autarky the equilibrium relative price of the status good would be higher in Country 2 than in Country 1 (i.e., $p^2 > p^1$) if preexisting levels of inequality in both countries are sufficiently low and would be higher in Country 1 than Country 2 (i.e., $p^1 > p^2$) if preexisting levels of inequality in both countries are sufficiently high. Further, since by the Stolper Samuelson theorem, r increases and w decreases with p, we have $r^2 > r^1$ and $w^2 < w^1$ if $\sigma^1 < \sigma^2 < (3-\sqrt{2})/2$ and $r^1 > r^2$ and $w^1 < w^2$ if $(3-\sqrt{2})/2 < \sigma^1 < \sigma^2$.

2.3 Open Economy Equilibrium

Suppose now the two countries open up to free trade. Figures 2(a) and 2(b) show the open economy equilibria when the countries have sufficiently low and sufficiently high levels of income inequality respectively. The world average supply curve is same as the individual supply curves, i.e., $Y_S^1 = Y_S^2 = Y_S$ since there are no supply side differences between the countries. The aggregate demand curves for the two countries are given by Y_D^1 and Y_D^2 respectively and the world average demand curve is given by $Y_D = (Y_D^1 + Y_D^2)/2$. The intersection of the average supply and demand curves determine the free trade equilibrium (relative) price and quantity of status good which we denote as p^W and $\widetilde{S}^W$ respectively. After trade is opened up, price of status good, as well as rental-wage ratio falls in Country 2 and rises in Country 1 when the preexisting levels of inequality in the two countries are sufficiently low and the opposite happens when the countries are characterized by sufficiently high levels of inequality to start with. Thus, when the levels of preexisting inequality are low in both the countries, Country 2 exports the non-status good and imports the status good and Country 1 does the opposite. However, when the preexisting levels of inequality are high in the two countries, Country 1 exports the non-status good and imports the status good and Country 2 does the opposite.

What if the two countries have 'large' difference in the preexisting levels of inequality? Suppose that Country 2 is 'extremely unequal' and Country 1 is 'extremely equal' to start with ($\sigma^1 < (3-\sqrt{2})/2 < \sigma^2$). It is evident that in this case, trade will not necessarily emerge between the two countries. That is because the aggregate demand for status goods in the two countries may be equal. Even if the aggregate demands differ in the two countries, our model cannot make any specific prediction regarding the pattern of trade emerging out of differences in inequality: it is equally likely for either of the two countries to become a net exporter (net importer) of the status good (non-status good). Thus we have the following proposition:

Proposition *With status-dependent preferences that are non-homothetic, free trade between two countries that differ only in the levels of income inequality causes the more unequal country to export the non-status (status) good and import the status good (non-status) good and less unequal country to export the status (non-status) good and import the non-status (status) good if the preexisting levels of income inequality in both the countries are sufficiently low (high).*

3 Conclusion

In this note, based on insights from behavioral economics and social psychology, we have incorporated demand side considerations in an otherwise standard neoclassical model of international trade in a systematic but straightforward way to show how differences in preexisting levels of inequality across countries may potentially determine the pattern of international trade when individual preferences are non-homothetic. Although our model may seem somewhat stylized, we believe that at the very least, we have been able to offer a new, simple and a rather 'unconventional' framework that might be used to analyze trade between countries in absence of supply side differences. An useful extension of our model would be to consider a monopolistically competitive setup where there is continuum of goods that could be ordered by status ranking. This is likely to yield very detailed predictions concerning trade patterns, the empirical validation of which might be of crucial interest. Further, generalizing the utility function that represents preferences of individuals in our model might also be useful for future research. We, however, postpone these tasks until later.

References

Bagwell, L. S. and Bernheim, B. D. (1996), Veblen effects in a theory of conspicuous consumption, *American Economic Review*, 86, 349–73.

Beggan, J. K. (1992), On the social nature of nonsocial perception: The mere ownership effect, *Journal of Personality and Social Psychology*, 62, 229–237.

Berger, J., Zelditch, M., Anderson, B. and Cohen, B. P. (1972), Structural aspects of distributive justice: A status value formulation, In: J. Berger, M. Zelditch, and B. Anderson (Eds.), *Sociological theories in process*, 119–146, Boston: Houghton-Mifflin.

Blanchflower, D. G. and Oswald, A. J. (2004), Well-being over time in Britain and the USA, *Journal of Public Economics*, 88, 1359–1386.

Caron, J., Fally, T. and Markusen, J. R. (2014), International trade puzzles: a solution linking production and preferences, *Quarterly Journal of Economics*, 131, 1113–1180.

Clark, A. E., Frijters, P. and Shields, M. A. (2008), Relative Income, Happiness, and Utility: An Explanation for the Easterlin Paradox and Other Puzzles, *Journal of Economic Literature*, 46, 95–144.

Clark, A. E., and Senik, C. (2010), Who Compares to Whom? The Anatomy of Income Comparisons in Europe, *Economic Journal*, 120, 573–594.

Davis, D. R. (1995), Intra-industry Trade: A Heckscher-Ohlin-Ricardo Approach, *Journal of International Economics*, 39, 201–26.

Davis, D. R. (1998), Critical Evidence on Comparative Advantage? North-North Trade in a Multilateral World, *Journal of Political Economy*, 105, 1051 – 1060.

Davis, D. R. and Weinstein, D. E. (2003), The Factor Content of Trade. In: K. Choi and J. Harrigan (Eds.), *Handbook of International Trade*, Vol. 1, New York: Blackwell.

Davis, D. R. and Weinstein, D. E. (2008), Do Factor Endowments Matter for North-North Trade?, In: S. Marjit and E. Yu (Eds.), *Contemporary and Emerging Issues in Trade Theory and Policy*, 24–48, United Kingdom: Emerald Group Publishing Limited.

Duesenberry, J. S. (1949), *Income, Saving and the Theory of Consumer Behavior*, Cambridge: Harvard University Press

Ferrer-i-Carbonell, A. (2005), Income and Well Being: An Empirical Analysis of the Comparison Income Effect, *Journal of Public Economics*, 89 , 997–1019.

Frank, R. H. (1985a), *Choosing the Right Pond: Human Behavior and the Quest for Status*, Oxford: Oxford University Press.

Frank, R. H. (1985b), The demand for unobservable and other non-positional goods, *American Economic Review,* 75, 101–116.

Grossman, G. M. and Maggi, G. (2000), Diversity and Trade, *American Economic Review*, 90, 1255–1275.

Grossman, G. M. and Rossi-Hansberg, E. (2012), Task Trade between Similar Countries. *Econometrica*, 80, 593–629.

Grossman, G. M. and Shapiro, C. (1988), Foreign Counterfeiting of Status Goods, *Quarterly Journal of Economics*, 103, 79–100.

Heffetz, O. and Frank, R. (2010), Preference for Status: Evidence and Economic Implications, In: J. Benhabib, A. Bisin and M. O. Jackson (Eds.), *Handbook of Social Economics*, Vol. 1A, 69–91, Amesterdam: North-Holland.

Helpman, E. (1981), International Trade in the Presence of Product Differentiation, Economies of Scale and Monopolistic Competition: A Chamberlin-Heckscher-Ohlin Approach, *Journal of International Economics*, 11, 305–340.

Hollander, H. (2001), On the validity of utility statements: standard theory versus Duesenberry's, *Journal of Economic Behavior and Organization*, 45, 227–249

Hunter, L. C. (1991), The contribution of nonhomothetic preferences to trade, *Journal of International Economics*, 30, 345–58

Hunter, L. C. and Markusen, J. (1988), Per Capita Income as a Basis for Trade, In: R. Feenstra (Ed.), *Empirical Methods for International Trade*, Cambridge: MIT Press.

Krugman, P. R. (1979), Increasing Returns, Monopolistic Competition, and International Trade, *Journal of International Economics*, 9, 469–79.

Krugman, P. R. (1981), Intraindustry Specialization and the Gains from Trade, *Journal of Political Economy*, 89, 959–973.

Marjit, S., Santra, S. and Hati, K. K. (2015), Relative Social Status and Conflicting Measures of Poverty: A Behavioral Analytical Model, *Journal of Quantitative Economics*, 13, 77-86.

Markusen, J. (1986), Explaining the volume of trade: an eclectic approach, *American Economic Review*, 76, 1002–11

Markusen, J. (2013), Putting Per-Capita Income back into Trade Theory, *Journal of International Economics*, 90, 255-265.

Mitra, D. and Trindade, V. (2005), Inequality and trade, *Canadian Journal of Economics*, 38, 1253-1271.

Reimer, J. J. and Hertel, T. W. (2010), Nonhomothetic Preferences and International Trade, *Review of International Economics*, 18, 408-425.

Rucker, D. D. and Galinsky, A. D. (2008), Desire to acquire: Powerlessness and compensatory consumption, *Journal of Consumer Research*, 35, 257–267.

Sivanathan, N. and Petit, N. C. (2010), Protecting the self through consumption: Status goods as affirmational commodities, *Journal of Experimental Social Psychology*, 46, 564-570.

Tchamourliyski, Y. (2002), Distance and bilateral trade: the role of nonhomothetic preferences, Boston College manuscript.

Thursby, J. G. and Thursby, M. C. (1987), Bilateral trade flows, the Linder hypothesis, and exchange risk, *Review of Economics and Statistics*, 69, 488–95

Truyts, T. (2010), Social Status in Economic Theory, *Journal of Economic Surveys,* 24, 137–169.

Weiss, Y. and Fershtman, C. (1998), Social Status and Economic Performance: A Survey, *European Economic Review,* 42, 801–20.

Appendix A

In what follows, we show that the chosen $f(.)$ and $\phi(.)$ functions ensure that falling behind hurts.

Note that, for $y_i < \overline{y}$ we can write the utility function given by equation (2) as

$$U_i = \frac{y_i}{\overline{y}} \log N_i + \log S_i$$

Let U^* denote the optimal value function

$$U_i^* = \frac{y_i}{\overline{y}} \log N_i^* + \log S_i^*$$

where N^* and S^* denotes the optimal values of N and L.

For the benchmark case $y_i = \overline{y}$, we have

$$U_i^o = \log N_i^o + \log S_i^o$$

Now if falling behind has to hurt, it must be that $(U_i^* - U_i^o) < 0$.

Differentiating U_i^* w.r.t. $y_i/\overline{y}$:

$$\frac{dU_i^*}{d\left(\frac{y_i}{\overline{y}}\right)} = \log N_i^* + \frac{y_i}{\overline{y}} \frac{d(\log N_i^*)}{dN_i^*} \frac{dN_i^*}{d\left(\frac{y_i}{\overline{y}}\right)} + \frac{d(\log S_i^*)}{dS_i^*} \frac{dS_i^*}{d\left(\frac{y_i}{\overline{y}}\right)}$$

Due to the Envelope theorem

$$\frac{dU_i^*}{d\left(\frac{y_i}{\overline{y}}\right)} = \log N_i^* > 0$$

This implies that if $y_i/\overline{y}$ falls, then U_i^* will fall.

Again, we know that for $y_i = \overline{y}$, $U_i^* = U_i^o$. In other words, for $(y_i/\overline{y}) = 1$, $U_i^* = U_i^o$.

Since, $(y_i/\overline{y})$ falling below 1 implies that $y_i < \overline{y}$ and a fall in $y_i/\overline{y}$ implies a fall in U_i^*, then it must be that for $y_i < \overline{y}$, $U_i^* < U_i^o$. That is, falling behind hurts.

Also, since it will be apparent in our analysis that $f(.)$ does not have an explicit role (that is, it does not appear in the demand functions), one might be tempted to ask if one could get rid of this particular function, i. e., assume $f = 1$ for all y. It is easy to see from an exercise similar to the one above that now we would have

$$\frac{dU_i^*}{d\left(\frac{y_i}{\overline{y}}\right)} < 0$$

and hence falling behind will not hurt.

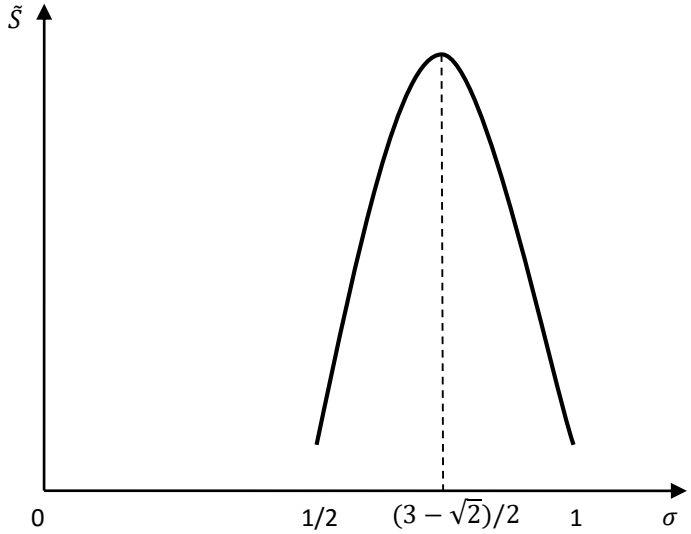

Figure 1. Relation between $\tilde{S}$ and σ

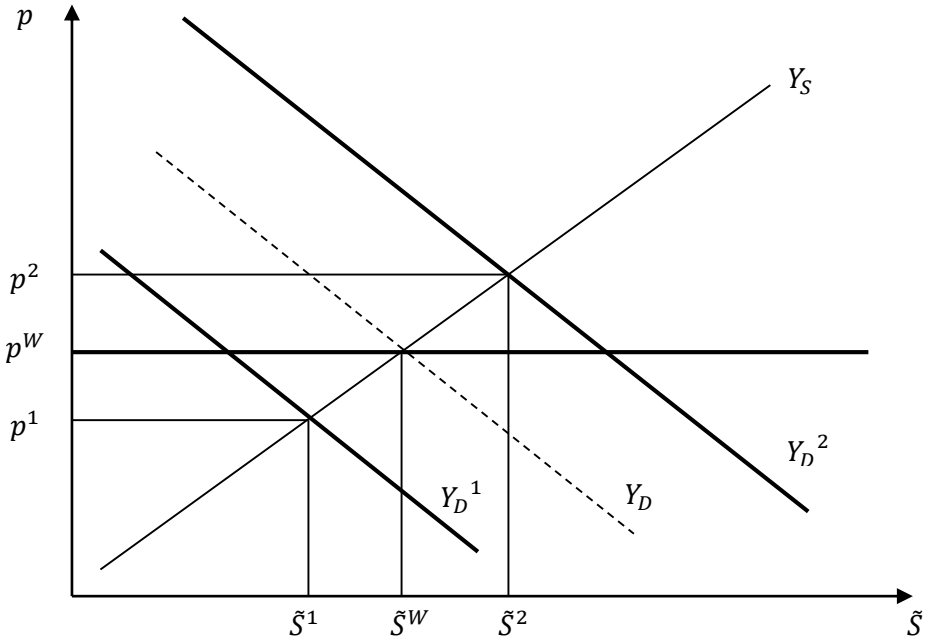

Figure 2(a). Closed and open economy equilibria when $\sigma^1 < \sigma^2 < (3 - \sqrt{2})/2$

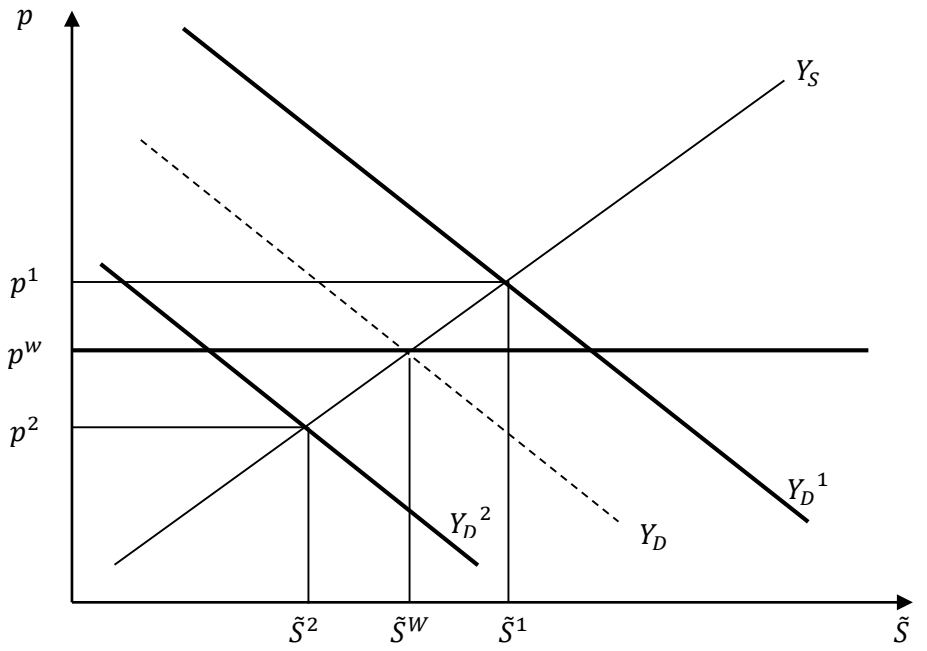

Figure 2(b). Closed and open economy equilibria when $(3 - \sqrt{2})/2 < \sigma^1 < \sigma^2$