



DEPARTMENT OF ECONOMICS

ISSN 1441-5429

DISCUSSION PAPER 17/05

**INTERNATIONAL DEMONSTRATION EFFECT AND DOMESTIC DIVISION OF LABOUR: A
SIMPLE MODEL ***

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Abstract

The implications of the international demonstration effect (IDE) for the development of underdeveloped economies have long been studied and debated. Yet few formal analyses exist in the literature, especially regarding its implications for the growth of domestic markets and the division of labour in developing economies. We offer an analysis of endogenous specialization under IDE, the first of its kind, showing that, far more complicated than the scenario held by conventional wisdom, IDE makes more difficult the *emergence* of the market underpinning the domestic division of labour, but facilitates the expansion of the market once the market has been developed.

Keywords: External habit formation; specialization and division of labour; international demonstration effect; economic development; emergence and extent of the market.

JEL: O12.

* We thank but in no way implicate Yew-Kwang Ng and Russell Smyth for useful discussion and comments.

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1. INTRODUCTION

The purpose of this paper is to formally analyze a hitherto largely overlooked aspect of the “international demonstration effect” (IDE) *à la* Nurkse, namely the effect of international consumption externalities on the development of the domestic market and the division of labour in the developing economies.

Nurkse (1953) masterly applies Duesenberry’s (1949) notion of demonstration effect, which Duesenberry developed to explain the otherwise puzzling saving behavior in the US during first few decades of the 20th centuries, to the international plane, arguing that individuals in poor countries imitate consumers in rich countries in consumption behavior due to international demonstration. Such imitation pushes up the propensity to consume in poor countries, thereby making it more difficult for saving accumulation and hence capital formation therein. Pursuing further along Nurkse’ major reasoning, focusing on the increasing gap in capital stock between the North and the South, Dutt (1988), and recently Araujo and Teixeira (2004) more elaborately by incorporating technical progress, formalize the idea that IDE, together with the Prebisch-Singer effect,¹ is responsible for the increasing uneven development between the North and the South over time. Of course, IDE is by nature a multiple-faced phenomenon, manifesting itself in technology diffusion and “dollar shortage” as well (see eg. Nurkse, 1953; Hirschman, 1958 and Kottis, 1971).²

This paper aims to explore the implications of IDE for the development of the domestic market and specialization in production in underdeveloped economies, an aspect that has been largely overlooked in the IDE literature. Kottis (1971, p.464) has explicitly discussed the stimulation of IDE on the division of labour and specialization in underdeveloped economies. But his treatment is fairly sketchy, leaving the extent of the market unaddressed. Moreover, as shown below, IDE does not always stimulate the division of labour. We develop a simple model by analytically drawing on the burgeoning literature of external habit formation (virtually interchangeably referred to as

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¹ Prebisch (1959) and Singer (1975) argued, as dictated by Engel’s Law, Southern consumers consume more and more Northern products as income increases.

² Cf. Afentiu (1979) for an insightful analysis of the conceptual challenge as well as empirical relevance of IDE.

catching-up with the Joneses).³ This literature, basically inspired by Veblen's (1899/1934) pioneering analysis, has made noticeable progress in formulating the effect and implications of *relative* consumption/income in the last two decades, thanks to the work of Robert H. Frank and Andrew R. Abel among others.⁴ The idea is that one's well-being is affected by the consumption of others through a "benchmark" parameter (or the "habit" stock) in the utility function⁵. This idea has generated fairly intriguing studies and shed new light on issues in several fields, eg., Abel (1990) and Campbell and Cochrane (1999) on stock market behavior; Ljungqvist and Uhlig (2000) on public finance in productivity-shock driven economies; Alvarez-Cuadrado *et al.* (2004) on endogenous growth models; Jakee and Sun (2005) on political economy of the welfare state, etc. With regard to evidence of the consumption externality, Luttmer (2004) finds that empirically "higher earnings of neighbors are associated with lower levels of self-reported happiness", and Ravina (2005), examining a panel data set of Californian credit card accounts, concludes that "the strength of the external habit, captured by the fraction of the consumption of the reference group that enters the utility function, is 0.290". Zizzo (2003) surveys empirical evidence on how preference is informed by environmental factors and inter-personal relative consumption/income in particular. This evidence is obtained from several disciplines including development psychology, experimental economics, neurosciences, comparative culture studies, etc.

Another literature on which we draw is that of endogenous specialization. Martens (1999) and Cheng and Yang (2004) provide two comprehensive surveys of this literature, of which one major aim is to revive and further elaborate classical economic thought, as represented by Adam Smith (1776) and Allyn Young (1928), on the key role played by the division of labour in economic performance in general, and in economic growth and development in particular.

In this paper, we develop a simple model of endogenous specialization under IDE to examine the consequences of having rich neighbors, in the international arena, on the development of the

³ It is noteworthy that Nurkse (1953, p.61) used the term "keeping up with the Joneses" to refer to Veblen's concept of conspicuous consumption, as a contrast to "demonstrating leading to imitation". In the contemporary literature of external habit formation, catching/keeping up with the Joneses, however, is far closer to the Duesenberry-Nurkse' demonstration effect than to Veblen's conspicuous consumption. For a criticism of Nurkse's explicit rejection of the Veblenian consumption when analysing IDE, see James (2000A). Our analysis below will be confined to the Nurksian IDE.

⁴ See, e.g., Frank (1999) and Abel (1990). The idea that one's preference is not *ex ante* given is of course quite old. For instance, Marx (1857-58) already touches on some rudimentary notions of how one's wellbeing is influenced by the social environment including others' affluence. See also Marshall (1890, Appendix 2, Sections 6-7).

⁵ That one's well-being is affected by her own past consumption history is called the *internal* habit formation.

domestic market, the allocation of resource and division of labour within a relatively underdeveloped economy/country. Our analysis shows that at the primitive stage of economic development, there exists another effect on the wellbeing of individuals in a poor economy, which manifests itself through hindering emergence of labour specialization therein. This is in addition to the well understood curse of being in the shadow of rich neighbors, i.e., a disutility derived out of neighbors' affluence due to relative economic standing, But once the economy "takes off" in the sense that domestic division of labour and the underpinning market system have been established, IDE may, as Kottis (1971, p.464) correctly points out, "stimulate the division of labour and specialization", through expanding the market.

Before moving on to a formal analysis, it may be worthwhile to expand a few more words on the detrimental implications of IDE under certain circumstances for the emergence of the division of labour, because of the counter-intuitiveness of such implications. As has been thoroughly studied in economic analysis, international trade undoubtedly brings about mutual benefits to trade partners, especially when there exist significant comparative advantages between them, for instance when one has comparative advantage in making capital intensive products and the other in making labour intensive products. It is also well understood that a more integrated system of economies/regions facilitates information flow, technology diffusion, etc, thus resulting in remarkable welfare improvement, *even*, for some reasons, in the absence of materialized trade. Without denying the above benefits brought in by intercourse between the countries, and in no way arguing against market integration, we nonetheless would like to draw attention to one side-effect of international interaction other than its well-articulated negative effect on capital formation (Nurkse, 1953), that is, the effect brought about by the mere knowledge of the existence of a richer lifestyle elsewhere on the performance of the poorer economy. This externality originates from the acquisition of information, via trade or otherwise, of higher levels of consumption in rich countries/economies, and carries on to affect the pattern of division of labour in the poor economy.⁶ It is apparent that this consumption externality is welfare-reducing, but how does it affect the domestic level of specialization? A first guess would be: to "catch up with the Joneses" (the rich foreigners, in this case), people in this poor economy will work harder in order to consume more, and thereby extending the market size and creating scope for higher level of specialization. However, our analysis suggests quite the opposite: as the level of externality increases, the level of domestic specialization may deteriorate, thus resulting in a decline in *per capita* income.

⁶ It is true that such international consumption externality goes in both directions, but we shall focus on the effect on the poor economy only, for the effect on the individual in the affluent regions/economies is presumably by far smaller, since human beings by nature derive much more disutility from having a richer neighbour than utility from a poorer neighbour.

This result may, to many, run counter to intuition, but it is not inexplicable, as shown in the next section. Section 3 concludes, briefly remarking on implications of our analysis.

2. ANALYSIS

2.1. A model of endogenous specialization with consumption externality

To isolate IDE as clearly as possible, we deliberately assume throughout that no trade occurs, since otherwise the analysis would be much more complicated without generating more insights.

Consider an isolated economy, for instance, a small island that virtually has no contact with other societies. All the inhabitants are assumed intrinsically identical in all characteristics, each has one unit of time endowment. There are two consumption goods X and Y. The utility function of each individual is $u(x, y) = xy$, where $x(y)$ represents the amount consumed of X(Y). The production function, specific to each individual, is the same for both goods, with a constant marginal return and a fixed learning cost, $l_x = ax + b$, $l_y = ay + b$, $a, b > 0$. That is, $l_x(l_y)$ amount of labour is needed to produce $x(y)$ units of X (Y). Note that there exist economies of specialization in production due to the fixed learning cost, which implies that the division of labour among agents within the said economy can save on total learning costs for the society as a whole by avoiding duplicated learning. An iceberg trading (purchasing) technology is assumed, $g(x) = kx$, $g(y) = ky$, $k \in (0,1)$, that is, costs of exchanging are borne by the buyers alone and a fraction $1-k$ of each unit of good purchased disappears in transit.⁷

Denoting the price of Y in terms of X as p , $p \equiv p_Y / p_X$, it is quite straightforward to identify the equilibrium structure of division of labour by the algorithm developed in Sun (2003) for solving endogenous specialization models as surveyed in Cheng and Yang (2004). The result is summarized in Table 1.

Table 1. Parameter subspaces and equilibria for Example 1 ($k^* = [(1 - 2b)/(1 - b)]^2$)

	$k < k^*$	$k > k^*$
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⁷ The budget balance of each agent implies that any seller of one good must be a buyer of the other good, and therefore the assumption that only buyers pay the trading cost is made purely for simplifying modelling analyses and should be interpreted as covering a quite general family of forms in which the buyers and sellers share the cost of exchange.

Equilibrium prices	any $p \in (\frac{k}{k^*}, \frac{k^*}{k})$	
	(shadow equilibrium price set)	$p^*=1$
Structure of the division of labor	no trade among agents	Division of labor (half population specialize in producing X(Y))

The basic trade-off between gains from specialization (saving on learning costs) and trading costs determines the equilibrium pattern of the division of labour in production for the whole economy. The division of labour occurs in equilibrium if and only if $k > [(1 - 2b)/(1 - b)]^2$, which may legitimately be interpreted either as that the trading efficiency is high enough for a fixed production technology and endowments, or as that the economies of specialization are sufficiently significant for given trading conditions, $b > (1 - \sqrt{k})/(2 - \sqrt{k})$, so that gains from the division of labour outweigh the costs of exchange between individuals of different specialization patterns. For our purpose, we shall mainly take the first interpretation in what follows.

Now assume that the isolation of the economy is, for some reason, brought to an end, and the inhabitants in the “island economy” get to learn of the consumption levels of inhabitants in some other economies, which are realistically assumed to be considerably richer than the economy under analysis. Through the mechanism of “external habit”, the observation of the foreigners’ higher consumption results in less satisfaction from the same bundle of consumption than before. For simplicity, following in spirit the modeling used in the literature of “catching up with the Joneses”,⁸ we revise the utility function to characterize this externality as $u(x, y) = (x - \theta)(y - \theta)$, where θ is a positive and small real number characterizing the international consumption externality, which depends on the gap in consumption/income between the richer countries and the poor economy, as well as the extent to which consumers in the poor economy are aware of such a gap. In other words, the benchmark consumption level of the locals increases due to the external habit formation mechanism, through which awareness of higher levels of consumption in more advanced economies makes the locals feel jealous and that they have fallen behind..⁹ To explore the implications of this effect alone, we assume that the economy is now open only in terms of information inflow, that is, the opulence of other economies comes to the knowledge of the inhabitants in the poor economy, but neither trade with, nor foreign direct investment from the other

⁸ Refer to, Abel (1990), Campbell and Cochrane (1999), Ljungqvist and Uhlig (2000), Auray et al (2002), Alvares-Cuadrado et al (2004) among others.

⁹ Here we ignore the influence of “external habit” *between* fellow residents in the economy, since it makes no difference to the analysis at hand. See p.1-2 of Luttmer (2004).

economies materializes. For convenience, we call such an economy as an *informatively open economy*.

Applying again the algorithm used above, we obtain the following,

Table 1'. Parameter subspaces and equilibria of modified Example 1

$$(k^{**} = \{1 - \frac{1 - \sqrt{(1 - 2b - 2a\theta)^2 + 4a\theta(1 - b - a\theta)}}{2(1 - b - a\theta)}\}^2 < 1)$$

	$k < k^{**}$	$k > k^{**}$
Equilibrium prices	any $p \in (\frac{k}{k^{**}}, \frac{k^{**}}{k})$ (shadow equilibrium price set)	$p^*=1$
Structure of the division of labor	no trade among agents	Division of labor (half population specialize in producing X(Y))

It comes as no surprise that the utility level, regardless of the values of parameters, declines as a consequence of informative opening of the poor economy, for the benchmark consumption level of each good increases after the opening. What is interesting is that after the opening, the efficiency of trading that allows for the emergence of labour specialization has to increase. Indeed, it can be shown that $\partial k^{**} / \partial \theta > 0$ (we omit the details to save space). That is, due to the psychological pressure from the more luxurious lifestyle of the richer economies, the economy under analysis, in the absence of trade with, or foreign direct investment from, the former, may move *backwards* in terms of degree of domestic division of labour. For a certain range of trading efficiency parameter k , the domestic market shrinks (to zero) and the social organization of production degenerates from one featured by labour specialization into another without division of labour and hence gains from domestic division of labour and trade forgone. This result may appear somehow counter-intuitive. But it indeed holds true even for a more general model. We shall illustrate the result in an economically intuitive manner after analyzing the generalized model.

2.2. The generalized model

We now consider a more general form of preference represented by the following CES utility function $u_{\theta}(x, y) = [(x - \theta)^{\rho} + (y - \theta)^{\rho}]^{1/\rho}$, $\rho < 1$. The production technology exhibits increasing returns to labour specialization, $x = f(l_x)$, $y = f(l_y)$. The trading technology remains unchanged from the preceding subsection.

Equilibrium solutions of this model are summarized in Table 2 below.

Table 2. Parameter subspaces and equilibria of the generalized model

$$(\tilde{k} \text{ satisfies } 2^{1/\rho}[f(L/2) - \theta] = \{k[f(L) - \theta] - \theta\}[1 + k^{\rho/(\rho-1)}]^{(1-\rho)/\rho})$$

	$k < \tilde{k}$	$k > \tilde{k}$
Equilibrium prices	any $p \in (\frac{k}{\tilde{k}}, \frac{\tilde{k}}{k})$ (shadow equilibrium price set)	$P^*=1$
Structure of the division of labor	no trade among agents	Division of labor (half population specialize in producing X(Y))

Note \tilde{k} denotes the critical value of the trading parameter k at which it makes no difference in terms of utility for the agent to *either* specialize and engage in trade, *or* self-produce both goods with no exchange with others.

We claim (proof is found in Appendix),

Proposition 1. The larger the externality of consumption in the more prosperous economy for the informatively open economy, the less likely the domestic division of labour emerges in the latter, i.e.,

$$\partial \tilde{k} / \partial \theta > 0$$

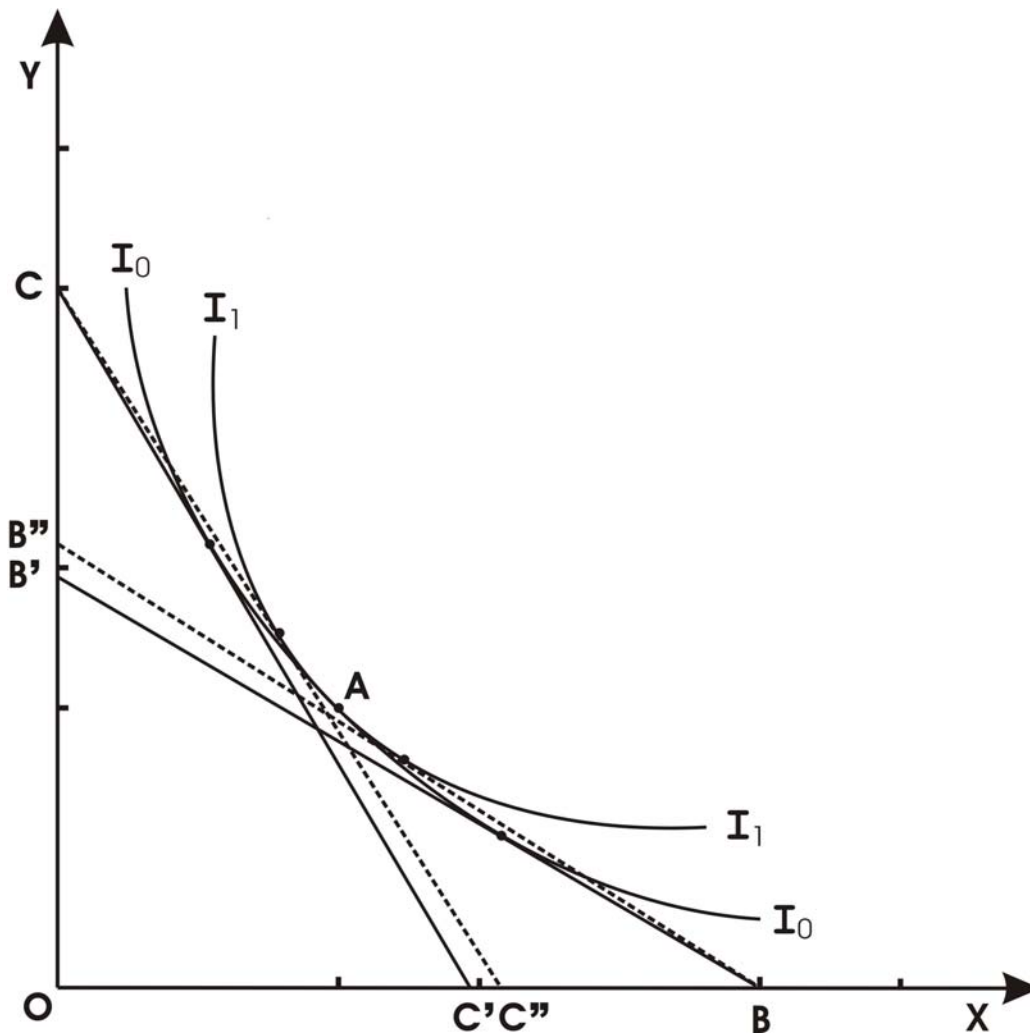


Figure 1

Now we illustrate this result graphically in Figure 1. The indifference curves passing through the autarky point A before and after the opening of information are denoted by I_0 and I_1 respectively. It can be shown that I_1 is more convex than I_0 , and more generally, the greater the value of θ , the more convex the curve I_1 is.¹⁰ To illustrate, consider the situation when $x < y$ (analysis for the

10 For any value of θ , consider the marginal rate of substitution (MRS) along the indifference curve, $u_\theta = [(x-\theta)^\rho + (y-\theta)^\rho]^{1/\rho}$. Denote by x_θ the amount of x and y when they are equal, i.e.,

$$[(x_\theta - \theta)^\rho + (x_\theta - \theta)^\rho]^{1/\rho} = u_\theta = [(x-\theta)^\rho + (y-\theta)^\rho]^{1/\rho}. \text{ Thus, } 1 + \left(\frac{y-\theta}{x-\theta}\right)^\rho = 2\left(\frac{x_\theta - \theta}{x-\theta}\right)^\rho. \text{ Moving}$$

along the indifference curve, $MRS = -dy/dx = [(y-\theta)/(x-\theta)]^{1-\rho} = [2\left(\frac{x_\theta - \theta}{x-\theta}\right)^\rho - 1]^{(1-\rho)/\rho}$. Thus, for

any $x < x_\theta$ ($x > x_\theta$), MRS increases (decreases) with θ .

case of $x > y$ is similar). As the benchmark consumption of each goods increases, one has to be given more Y for one less unit of X in order to remain on the same utility level (indifference curve), since goods X is in effect scarcer and thus has to be given greater relative importance to goods Y, due to the preference for variety characterized by the CES utility function. Note that $\rho < 1$ implies the convexity of preference. In Figure 1, points B and C represent individual choices of specializing in X and Y, respectively. Symmetry of the model between goods X and Y requires that the two goods are of the same price when division of labour and exchange occur. Consequently, the critical level of trading efficiency k , i.e., \tilde{k} , alone determines the slopes of two budget lines BB' and CC' for X experts and Y experts respectively (whereas dashed budget lines BB'' and CC'' represent the case after information opening), which are tangent to the indifference curve passing through the autarkic equilibrium point A when $k = \tilde{k}$. It is then clear that a larger externality will induce a more convex group of indifference curves and thus a higher level of k is required for specialization to emerge.

Intuitively, after the informative opening, for any individual in this economy all the physical constraints stay the same, but psychologically he is disadvantaged. The larger the value of θ (the stronger the externality), the more indispensable both goods X and Y. Due to the preference for diversity as characterized by the convex indifference curves, in the case of having more X than Y, $x > y$, the marginal rate of substitution MU_X/MU_Y decreases with θ . That is, for any one choosing to be an X specialist, she must give up more X in order to gain one more unit of Y when moving along the same indifference curve as θ becomes larger. Thus, for specialization and division of labour to emerge, a higher level of trading efficiency is needed after the informative opening.

2.3. An expanded model with time allocation between working hours and leisure

We now expand the above model to incorporate the choice of working-hours versus leisure. Assume that the utility function is $u_\theta(x, y, s) = [(x - \theta)^\rho + (y - \theta)^\rho]^{1/\rho} \cdot s$, $\rho < 1$, where s stands for leisure¹¹. The production technology is assumed linear with a fixed set-up cost to simplify the algebra without loss of insights, $l_x = x + \alpha$, $l_y = y + \alpha$, $\alpha > 0$. That is, $l_x(l_y)$ is needed to

¹¹ The effect of a benchmark level for leisure is neglected here, since consumption (or income) is generally considered a major source for relative economic standing but for some special circumstances such as the political economy of redistribution in the welfare state (Lindbeck et al 1999, Jakee and Sun 2005). See Solnick and Hemenway (1998) and Zizzo (2003) for empirical evidence on the significance of relative consumption/income concerns.

produce x (y) units of X (Y). The trading technology remains unchanged from the preceding subsection. Once again, what interests us is the critical value of k , denoted as \hat{k} , such that if and only if $k > \hat{k}$, the division of labour emerges. To save space, we omit the table that summarizes the equilibrium analyses (the counterpart of Tables 1 and 2 of the above two models), but must point out that the spirit of Proposition 1 still holds true even for such an expanded model wherein utility derives from consumptions as well as from leisure. We posit (proof is found in Appendix),

Proposition 2. For the expanded model as above, the larger the externality of consumption in the more prosperous economy for the informatively open economy, the less likely the domestic division of labour emerges in the latter, i.e.,

$$\partial \hat{k} / \partial \theta > 0$$

2.4. Extent of the existing market and labour supply

In the preceding two subsections, our analysis focuses on the critical value of the trading efficiency parameter k^* concerning the emergence of the domestic market and the division of labour from the autarkic equilibrium. We now turn to how IDE impacts the extent of the market and division of labour *if* the market that supports the nexus of the domestic division of labour has already materialized.

For the model introduced in subsection 2.2, if the domestic division of labour has already emerged, the amount of sold product per person, which can well serve as a proxy for the trade volume (extent) of the market, equals

$$x^s = y^s = \frac{f(L) + (k^{1/(\rho-1)} - 1)\theta}{1 + k^{\rho/(\rho-1)}}$$

which clearly increases with the IDE parameter θ . For the model incorporating the leisure-consumption choice considered in subsection 2.3, one can easily show that both the extent of the market and labour supply (also labour specialization in this case) of each individual increases with the IDE parameter θ (to save space we omit details). All these are consistent with the familiar argument as put forward long ago by Nurkse (1953, p. 63) and Kottis (1971, Section III) that awareness of luxurious lifestyles elsewhere encourages individuals in the poor economies to work harder, to be more specialized and to trade more, in order to catch up with the (foreign) Joneses in consumption.

It appears in order to emphasize once again that we deliberately isolate the international externalities of (relative) consumption by considering a model without international trade or international technology diffusion. As such, each consumption product in our simple model is domestically produced and is not a new product, e.g., a “gadget” imported from the North. *Even so*, the extent of external (international) habit formation mechanism alone suffices to expand the

already existing domestic market and hence enhance the *per capita* income (but not the wellbeing of the people) in the underdeveloped economies.

3. CONCLUDING REMARKS

Implications of the international demonstration effect (IDE) for development of underdeveloped economies have long been studied and debated since Nurkse (1953) raised the issue. Yet few formal analyses exist in the literature, especially with regards to the implication of IDE for the growth of domestic markets and division of labour in the poor economies. Drawing on recently developed analytical apparatus in the burgeoning literature of external habit formation, we offer an analysis of endogenous specialization under IDE, the first of its kind to the best of our knowledge, showing that the effect of international consumption externalities on the growth of the domestic market may be more complicated than held by conventional wisdom. Our analysis reveals that IDE makes more difficult the *emergence* of the market underpinning the domestic division of labour, but facilitates the expansion of the market once the market has been activated. Our model as such accommodates both the favorable and unfavorable effects, depending on the stage of economic development, of international demonstration for the development of the domestic market in the poor economy.

In particular, the detrimental consequence of IDE for the (under)development of the domestic market and labour specialization under certain circumstances may merit a few more words. As shown above, when the development of the domestic market system in a primitive economy merely takes off, awareness by its inhabitants therein of the income/consumption gap between rich and poor economies may lead to an unintended degradation in domestic division of labour and specialization. That is, on top of the negative, sometimes even devastating, Nurksian effect on capital formation in the underdeveloped economy (Nurkse 1953), IDE may bring in another detrimental consequence by hindering the development of the domestic market and (interregional and/or inter-personal) division of labour. Contrary to conventional wisdom, our analysis therefore demonstrates a perhaps even more troubling possibility that under plausible conditions, international demonstration may indeed provide a *disincentive* to have more produced for market exchange, making it more difficult for the nexus of the domestic division of labour to expand.

A careful reader maybe concerned with the robustness of our result with regard to the *symmetry* between products in our model, which is deliberately designed for the sake of analytical convenience. A more realistic postulate might be that consumers are more sensitive to the relative consumption of some particular product(s), the so called positional goods, and far less so to other (non-positional) goods. Analysis of asymmetric models modified from those presented in Section 2 such that the agents are sensitive only to the consumption of product X (but not product Y) reveals

that the major conclusions as obtained in subsections 2.2-2.4 remain unchanged, provided that IDE (of consumption in X) are not unrealistically too strong. (We omit the algebraic details, which are available upon request).

The parameter θ , serving as a proxy for the extent of IDE in consumption in our analysis, is treated as exogenously given. As recognized by Nurkse (1953) and James (2000B) among other authors, IDE in consumption/income is determined by the consumption/income gap between the poor and rich countries/economies, but can only be put into effect by the *awareness* of the gap by consumers in the poor economy. The former, on which most existing studies of IDE focus (e.g., Araujo and Teixeira, 2004), is undoubtedly important, yet the latter, due to the rapid diffusion of mass media and telecommunication technologies such as radios, televisions, mobile phones and perhaps more profoundly, the Internet, as well as a no less noticeable rise in global advertising, may deserve far more attention than it has so far received. Consumers in the poor economies suffer not only from “frustration and disappointment” from the awareness of the gap as cogently analyzed in James (2000B), but also, indirectly, from the underdevelopment of domestic market system as revealed in the analysis conducted in this paper.

It must be pointed out that our analysis should in no way be interpreted as an argument against international trade, and globalization in particular. It merely serves to highlight an important aspect of the consequences of increasing international contact that seems to have been overlooked so far. True, international contact whether or not in the form of trade, helps to provide more opportunity for advanced technology of production to spread into the underdeveloped economies. Yet it is much easier for consumption patterns on vogue in advanced countries to become targets for consumers in the underdeveloped countries trying to catch up with the (foreign) Joneses, thanks to the modern communication technology and advertising (James 2000B).¹² Moreover, benefits from international trade are not automatically realized for underdeveloped economies if developed countries do not open the market of those products/industries in which underdeveloped economies have comparative advantage; for instance, labour intensive agricultural products. Should this situation occur, without foreign direct investment or international income transfer one way or another, underdeveloped economies can only be trapped in a vicious circle, suffering not only from the problem of capital shortage, but also from a lack of a well-functioning system of markets as implied by our formal analysis. Indeed, there may well be the case that concomitant with informative opening of underdeveloped economies are the shrinking of domestic markets,

¹² It goes without saying that to incorporate IDE in production into the analysis of endogenous division of labour and market process would be a valuable extension of what is conducted in this paper. We leave this task to future study.

declining productivity and decreasing welfare, testifying to Duesenberry's (1949, p.27) witty remark that "...it is not only true that 'what you don't know won't hurt you,' but that what you do know does hurt you." To counteract the effects of international demonstration, which are virtually inevitable thanks to modern information technology, it is vital for primitive economies to be integrated into, and benefit from, materialized international trade. But that can take place only if free trade regimes prevail to fully exploit the mutual benefits from trade; that is, all trading partner countries adopt free trade policy, especially the advanced ones.

APPENDIX

We offer in this appendix proof of the two propositions presented in the text.

Proof of Proposition 1. First of all, note that in the case of no exchange with fellow beings of the economy and hence no division of labour among individuals, the agent evenly spends time producing each goods due to the convexity of preferences. Hence the maximized utility, $\tilde{U}_A = 2^{1/\rho} [f(L/2) - \theta]$. On the other hand, in the case of trading with others under a competitive price signal, which must be equal unity in equilibrium, the maximized utility is

$$\tilde{U}_B = \underset{x}{\text{Max}} \{ [f(L) - x - \theta]^\rho + (kx - \theta)^\rho \}^{1/\rho} = \{ k[f(L) - \theta] - \theta \} [1 + k^{\rho/(\rho-1)}]^{(1-\rho)/\rho}.$$

Let $H(k, \theta) \equiv \tilde{U}_B - \tilde{U}_A = \{ k[f(L) - \theta] - \theta \} [1 + k^{\rho/(\rho-1)}]^{(1-\rho)/\rho} - 2^{1/\rho} [f(L/2) - \theta] = 0$. It directly follows from the envelop theorem that, $\partial H / \partial k = \partial \tilde{U}_B / \partial k > 0$. On the other hand, $\partial H / \partial \theta = 2^{1/\rho} - (1+k)[1 + k^{\rho/(\rho-1)}]^{(1-\rho)/\rho} < 2^{1/\rho} - 2\sqrt{k} \{ 2k^{\rho/[2(\rho-1)]} \}^{(1-\rho)/\rho} = 0$. Thus, by the implicit function theorem, $\partial \tilde{k} / \partial \theta = -(\partial H / \partial \theta) / (\partial H / \partial \tilde{k}) > 0$. Proposition 1 is thus established.

Q.E.D.

Proof of Proposition 2. The proof is similar to that of Proposition 1. In the case of no exchange with fellow beings in the economy and hence no division of labour among individuals, the agent evenly spends time producing each goods due to the convexity of preferences. Manipulating the algebra, one obtains the maximized value of utility,

$$\hat{U}_A = 2^{(1-\rho)/\rho} \left(\frac{1}{2} - \alpha - \theta \right)^2$$

On the other hand, in the case of trading with others under a competitive price signal, which must equal unity in equilibrium, the maximized utility is

$$\hat{U}_B = k(1 + k^{\rho/(\rho-1)})^{(1-\rho)/\rho} \left[\frac{1}{2} (1 - \alpha - \theta - \frac{\theta}{k}) \right]^2$$

Let $V(k, \theta) \equiv (\hat{U}_B)^{1/2} - (\hat{U}_A)^{1/2} = \sqrt{k} (1 + k^{\rho/(\rho-1)})^{(1-\rho)/(2\rho)} \left[\frac{1}{2} (1 - \alpha - \theta - \frac{\theta}{k}) \right] - 2^{(1-\rho)/(2\rho)} \left(\frac{1}{2} - \alpha - \theta \right)$

We have, $\partial V / \partial \theta = 2^{(1-\rho)/(2\rho)} - \frac{1}{2} (1 + \frac{1}{k}) \sqrt{k} (1 + k^{\rho/(\rho-1)})^{(1-\rho)/(2\rho)}$

When $\rho > 0$, $1 + k^{\rho/(\rho-1)} > 2$, and $\frac{1-\rho}{2\rho} > 0$. Hence, $(1 + k^{\rho/(\rho-1)})^{(1-\rho)/(2\rho)} > 2^{(1-\rho)/(2\rho)}$. When $\rho < 0$,

$1 + k^{\rho/(\rho-1)} < 2$, and $\frac{1-\rho}{2\rho} < 0$. Thus, we also have, $(1 + k^{\rho/(\rho-1)})^{(1-\rho)/(2\rho)} > 2^{(1-\rho)/(2\rho)}$.

But, $\frac{1}{2}(1 + \frac{1}{k})\sqrt{k} > 1$. Thus, $\partial V / \partial \theta < 2^{(1-\rho)/(2\rho)} - 2^{(1-\rho)/(2\rho)} = 0$.

On the other hand it follows immediately from the envelop theorem that,

$$\partial V / \partial \hat{k} > 0$$

Thus, by the implicit theorem,

$$\partial \hat{k} / \partial \theta = -(\partial V / \partial \theta) / (\partial V / \partial \hat{k}) > 0$$

Q.E.D.

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