Entrepreneurship and conflict generating product price changes

A.G. Schweinberger
Department of Economics, University of Konstanz, Germany

Alan Woodland
School of Economics, University of New South Wales, Australia

March, 2011

Abstract

Why are vested interest groups and political economy activities much less significant in some countries than in others? We put forward the following hypothesis: because entrepreneurship is much more established in some countries than in others. In the former there exists a factor, say skilled labour which -in contrast to unskilled labour -is highly mobile between production and the setting up of firms. Making use of a model of a small open economy with one monopolistically competitive industry (good 2) and a variable elasticity of demand, we derive conditions under which an exogenous increase in the price of good 2 is conflict generating between the owners of unskilled and skilled labour in the short but Pareto improving in the long run. Generally speaking, output adjustments in good 2 at the intensive margin make for conflict generation; but the converse holds for adjustments at the extensive margin. By assumption all the rent in the short run equilibrium accrues only to the owners of skilled labour because they are also the owners of firms. Surprisingly, the price increase is more likely to imply a Pareto improvement in the long run if it has a strongly anticompetitive effect in the short run. The analysis and the results also highlight the importance of (a) the skilled labour intensity in the production of goods 1 and 2 relative to the skilled labour intensity of production and in the setting up of firms and (b) appropriately defined gross and net economy rates of return from the setting up of firms by the owners (skilled labour).

Key words: entrepreneurship, product price changes and conflict generation between the owners of firms and workers, monopolistic competition

---

1 Preliminary draft, please do not quote.
2 Department of Economics, University of Konstanz, Fach D 150, D-78457 Konstanz, Germany; Phone: +49/7531/88-2632; Telefax-No: +49/7531/991614; Email: a.schweinberger@uni-konstanz.de.
3 Corresponding author: School of Economics, University of New South Wales, Sydney 2052, Australia; Phone: +61/2-9385-9707; Telefax-No: +61/2-9313-6337; Email: a.woodland@unsw.edu.au.
I. Introduction

In which sense, if any, is trade liberalisation conflict generating between different agents? By trade liberalisation we mean not only the move from an autarkic to a free trade equilibrium but also changes in domestic prices due to the reduction of tariffs or other trade impediments. It seems that the above mentioned question raises one of the most fundamental and time honoured issues at the centre of theoretical and empirical work in positive and normative international economics.4

The literature which focuses on the said issue is huge. It ranges from the simple Stolper-Samuelson theorem and its generalizations to very recent contributions which make use of monopolistic competition models with heterogeneous firms (see, e.g. Egger and Kreickemeier 2009). As is well known, see e.g. Hillman (1989), the Stolper-Samuelson theorem and its key insight that product price changes have conflict generating effects on the owners of capital and labour respectively, represent the key stone of international political economy. Even more recent articles which have spawned an impressive literature on international political economy (see Grossman and Helpman, 1994) make use of models of the economy with intrinsic conflict generating effects i.e., a generalized Ricardo-Viner or sector specific factor model.

Much more recently, another article (see Melitz, 2003) introduced heterogeneous firms into the rich literature on monopolistic competition models. This has led to the unearthing of new sources of conflict generation associated with trade liberalisation: workers employed in certain firms gain because of a rise in productivity due to the selection effect of trade liberalization but other workers lose because they become unemployed. Equally important,

4 The above statement applies, of course, a fortiori to international political economy.
trade liberalization gives rise to an increase in the wage inequality of workers employed in the same industry (see Egger and Kreickemeier op.cit.).

It may be argued that the new sources of conflict generation are, in a certain sense, inherent in monopolistic competition models with heterogeneous firms. Clearly the novel insights are bound to have profound consequences not only for the modeling of the effects of trade liberalization on factor markets but also on international political economy in general and the explanation of trade policies in the presence of vested interest groups in open economies in particular.

This brings us to the main tenet of the present paper. There can be no doubt that many interesting and real world relevant results regarding the conflict generating effects of trade liberalization are obtained from models with heterogeneous firms in the very recent literature. However by focusing exclusively on the differences in productivity between firms the literature overlooks the fact that an increase in product differentiation (increase in varieties) due to trade liberalization could mitigate or even more than offset the conflict generating effects mentioned above.\(^5\) Arguably the number of varieties may be under-produced in the autarkic equilibrium. In this context, recall that the number of varieties can be interpreted as a privately produced public good. Furthermore, Broda and Weinstein (2006) provide very impressive evidence that the increase in the number of varieties associated with trade liberalisation must be regarded as a source of aggregate gains from trade liberalization of overwhelming importance.

The main issue addressed in our paper is clearcut. Making use of a simple model of monopolistic competition we ask whether product price changes associated with trade liberalisation are conflict generating if we allow for trade liberalisation to imply an increase

\(^5\) See e.g. the key assumption that all the heterogeneous firms produce a homogeneous good in Egger and Kreickemeier, op.cit.
in the number of firms and product varieties. In order to focus on essentials our model is very simple. Possible generalizations are sketched in part V. It is innovative above all in one important aspect: it relates the change in the production of varieties to the existence of entrepreneurial activities. As is well known, entrepreneurship in international trade is generally explained within the framework of networks (see Rauch ad Watson, 2002). At this point it should be emphasized that it would be pretentious to assert that our modeling of entrepreneurship captures all the interesting features of Rauch and Watson, (op. cit.).

On the other hand it seems to us that our monopolistic competition model does capture two of their features. We allow for two factors of production, unskilled and skilled labour. Skilled labour may be engaged in production or in entrepreneurial activity, i.e., the setting up of firms. Unskilled labour is used only in production. We distinguish between short and long run equilibria. Entrepreneurs can earn rent (super normal profits) in the short run equilibrium because they are the owners of firms. The existence of rents in short run equilibria provides incentives for skilled workers to become entrepreneurs. If, for example, the price of exported varieties rises, one may conjecture that in the short run (when output adjusts only at the intensive margin) the existence of super normal profits will magnify the conflict generating effects traditionally associated with the standard Stolper-Samuelson theorem. However intuition also tells us that in the presence of entrepreneurship the long run effects (as more firms are set up by entrepreneurs) may be very different. In fact we show that subject to certain conditions, the long run effects may (subject to certain assumptions) entail a Pareto improvement. This follows because the setting up of more firms implies an increase in the provision of varieties. The increased provision of varieties may be regarded as an increase in the provision of a privately produced public good. The latter conclusion hinges, of course, on

---

6 In Rauch and Watson (op.cit.) skilled workers make use of their knowledge of networks acquired in production to become trade intermediaries. Their model is based upon market matching.
the proof that the number of varieties is underprovided before trade liberalisation and the assumption that there are no barriers to entry. Surprisingly, it will emerge that, subject to our assumptions, an increase in the number of firms (ceteris paribus) does not imply a reduction in efficiency even if it is associated with a decrease in firm size.

It seems to us that our results are relevant in the real world for two reasons. First, because of the empirical literature on the gains from trade due to an increase in varieties mentioned above and secondly from the perspective of international political economy. We believe that it is important to put forward a framework in which the conflict generating effects of trade liberalization are not built into the model but derived from more basic assumptions. In this context we put forward the hypothesis that entrepreneurship is much more established in some East Asian countries than in Europe. It seems that there exists some prima facie evidence that lends support to our hypothesis; see e.g. Brandt et al. (2008). Arguably, the existence of political economy motives on the parts of agents and vested interest groups are less prevalent in some East Asian countries than in Europe. In our view this can be explained by the stylised fact that agents in East Asia are much more mobile between production and entrepreneurial activities and also the tendency to focus more on the long rather than the short term.

The paper is structured as follows. The basic model and its main properties are the subject matter of the following part II. The short run effects of an increase in the price of the manufactured good on the welfare of entrepreneurs and unskilled workers are analysed in part III. Part IV focuses on the long run effects. Part IV contains the main results of the paper. Finally in part V we summarise the main conclusions and put forward suggestions for generalisations of our analytical framework allowing for different approaches to explain the distribution of power within a firm.
II The model

The model is based upon the following assumptions:

(1) There are two factors of production: skilled and unskilled labour. Skilled labour is mobile between entrepreneurial activity, i.e., the setting up of firms and production. The endowments of both factors are exogenous.

(2) The country is a small open economy. All goods are internationally traded. Good 1 is produced under perfect competition, good 2 under monopolistic competition. Both goods are produced in the short run (with a given number of firms) as well as the long run equilibrium. Each firm in industry 2 produces a different variety.

(3) There are two household types. Type 1 only owns unskilled labour, household type 2 only skilled labour. Household type 2 owns the firms in industry 2 and therefore is entitled to earn residual or supernormal profits. To make the model tractable we also assume that both households have the same tastes. The latter are modeled by a utility function which is additively separable in the consumption of all the varieties and the good produced under perfect competition. Furthermore the utility function is quasilinear in the consumption of the good produced under perfect competition, i.e.:

the utility has the following form: \[ U = c_o + \sum_{i=1}^{\infty} \log c_i. \]

(4) Production is non-homothetic owing to the set up cost per firm.

The model of the economy consists of the following seven equations.

\[ a_{i1}(w_1, w_2)X_1 + a_{i2}(w_1, w_2)X_2 = V_i \]  

---

7 The assumption that the entire surplus accrues only to the owners of the firms may remind the reader of the Marxist approach, see Hart (1995) footnote 5 on page 5.
\[ a_{21}(w_1, w_2)X_1 + a_{22}(w_1, w_2)X_2 = V_2 - b \cdot n \equiv \bar{V}_2 \]  
(2)

\[ c_1(w_1, w_2) = a_{11}(w_1, w_2)w_1 + a_{21}(w_1, w_2)w_2 = p_1 \equiv 1 \]  
(3)

\[ c_2(w_1, w_2) = a_{12}(w_1, w_2)w_1 + a_{22}(w_1, w_2)w_2 = MR_2(p_2) \]  
(4)

\[ H_1E(1, G(p_2, n), u_1) = w_1V_1 \]  
(5)

\[ H_2E[1, G(p_2, n), u_2] = w_2V_2 + \left[ p_2 - MR_2(p_2) \right]X_2 - w_2bn \]  
(6)

\[ \left[ p_2 - c_2(w_1, w_2) \right]X_2 = w_2 \cdot b \cdot n \]  
(7)

where \( w_1 \) and \( w_2 \) denote the wage rates of unskilled and skilled labour respectively, the input coefficient of factor \( i \) per unit output of industry is denoted by \( a_{ij}, X_1 \) and \( X_2 \) stand for the total outputs of industry 1 and industry 2 respectively, the prices of the two goods are given by \( p_1 \) and \( p_2 \), \( MR_2(p_2) \) stands for the marginal revenue of good 2 \(^8\), \( E(\cdot) \) denotes the minimum expenditure function that is common to both household types, who obtain utility levels \( u_1 \) and \( u_2 \), \( G(p_2, n) \) is the price index of the good produced under monopolistic competition, \( H_1 \) and \( H_2 \) the number of households belonging to types 1 and 2 respectively, \( V_1 \) and \( V_2 \) are the total endowments of unskilled and skilled labour respectively and \( n \) is the number of monopolistically competitive firms.

Equations (1) to (6) describe the short run equilibrium and equations (1) to (7) the long run equilibrium. In the short run, the number of monopolistic firms in industry 2 is given. The model consists of two factor market equilibrium conditions, equations (1) and (2); two profit maximisation conditions, equations (3) and (4), as well as two income expenditure equalities

\(^8\) As can be seen, marginal revenue is only a function of \( p_2 \), see equation (4). This follows from the special assumptions we make in regard to the utility function, see assumption 3.
for the two types of households, equations (5) and (6). In equation (3), $\tilde{V}_2 = V_2 - bn$ stands for the amount of skilled labour used in production, the symbol $b$ representing the fixed set up requirement of skilled labour per firm. Note that we assume all supernormal profits only accrue to household type 2 - the owner of firms. In the short run, the model determines the endogenous variables comprising the two factor prices, the industry outputs and utility levels for the two households. Equation (7) represents, of course, the long run equilibrium condition for the determination of the number of monopolistic firms, which is a key feature of monopolistic competition models.

Note that, in contrast to the received literature, we can make use of an appropriately defined optimisation theorem (see Woodland 1982, 49ff) to derive a revenue function for the production sector of the form

$$R[1, MR_2(p_2), V_1, \tilde{V}_2] = X_1 + MR_2(p_2)X_2,$$

which has all the standard properties of a revenue function. For example, it is linearly homogeneous and concave in $V_1$ and $\tilde{V}_2$, and convex in $MR_2(p_2)$. Moreover, if the Jacobian determinant of the production cost functions is non-vanishing, it follows from the envelope theorem that supply functions of the form

$$X_i[1, MR_i(p_2), V_1, \tilde{V}_2]$$

exist, as do the factor price functions $w_i[1, MR_i(p_2)]$. Accordingly, the model may be reduced to equations (5)-(7), where $X_i = X_i[1, MR_i(p_2), V_1, \tilde{V}_2]$ and $w_i = w_i[1, MR_i(p_2)]$ are determined from equations (1)-(4).

Application of the duality approach is useful, because it yields many generalisations.

It is straightforward to see that production is non-homothetic due to the fixed set up cost of a firm. Evidently, the long run equilibrium condition implies that

$$p_2 = c_2(w_1, w_2) + w_2b / x_2$$  (8)
where \( x_2 = X_2 / n \) stands for the output per firm in industry 2. Equation (8) shows that in our model the degree of non-homotheticity rises as the output per firm falls.

In most monopolistic competition models production is homothetic because the input vector in setting up of firms and production are assumed to be collinear (e.g., Krugman (1979), Markusen and Venables (2000), Behrens and Murata (2007) and Helpman (2006)).

However, there also exist a number of articles in which production is allowed to be non-homothetic (e.g., Chao and Takayama (1990), Horn (1983)). Generally speaking, empirical evidence supports the hypothesis that production is non-homothetic (e.g., McDonough (1992)). However, to the best of our knowledge, there are no articles that relate the non-homotheticity of production to the conflict generating effects of product price changes to highlight the role of entrepreneurship and the ownership of firms.

An inspection of the model reveals that an increase in the world market price of good 2 may entail a rise in the total output of industry 2 due to (a) a rise in the output per firm (keeping \( n \) fixed), i.e., a rise at the intensive margin, and/or (b) a rise in the total output due to an increase in the number of firms, i.e., a rise at the extensive margin. We shall argue that the conflict generating consequences of changes in product prices hinge on the relative strengths of increases in output at the intensive and/or extensive margins.

To highlight the role of entrepreneurship in this context, we relax another standard assumption of monopolistic competition models by allowing the elasticity of demand, and therefore the profit margin, to be variable.

In this context there are two benchmark cases.

---

9 This rules out the modeling of entrepreneurship because in our approach entrepreneurship requires special skills which not all workers engaged in production are endowed with.

10 A recent article which makes use of a model with monopolistic competition and a variable elasticity of demand is Behrens and Murata (2007). Refer to others here: e.g., Ottaviani and Melitz.
(1) To this end, we assume that $e_{MR_2, p_2} \geq 0$, i.e., the elasticity of marginal revenue with respect to price is non-negative. If $e_{MR_2, p_2} = 0$, it follows from equations (3) and (4) of the model that a rise in $p_2$ does not affect factor prices. In this case an increase in the product price is said to be ultra-anticompetitive.\footnote{On the concept of pro- or anticompetitive effects of changes in product prices, see Helpman and Krugman (1985) and Schweinberger (1996).} Put alternatively, there are no changes in industry output at the intensive margin. Furthermore, the income of unskilled labour remains unchanged but the income of household type 2 rises because supernormal profits accrue to her in the short run equilibrium. Clearly there exist incentives for skilled labour to move from production to entrepreneurial activities.

(2) Our model also features another (second) benchmark case: total output of industry 2 rises only due to increases of output at the intensive margin. This possibility arises because the cost of setting up firms may augment. To this end we assume that the production of good 2 is intensive in skilled labour. Applying the standard Stolper-Samuelson theorem it follows at once that the setting up of firms becomes more costly if the price of good 2 rises. Note that if we assume (as is the case in most of the received literature) that the economy moves from one long run equilibrium to another, the role of entrepreneurship as well as the conflict generation effect of product prices in the short run equilibrium vanish.

### III The short run analysis

We now turn to the main issue addressed in this paper: are product price changes conflict generating? To answer this question we have to make an assumption regarding the ownership of firms. In perfectly competitive models the question does not arise because there are no firms. The latter statement also applies to monopolistic competition models, if – following
the received literature – one focuses only on the long run equilibrium. Surprisingly, as far as we are aware of it, even relatively recent models of international political economy apparently ignore this key issue. In what follows, we simply assume that all firms producing good 2 are completely owned by entrepreneurs (skilled labour). Therefore all the supernormal profits (rent) accrue only to household type 2,\(^{12}\) see the income expenditure equality of household type 2. Possible generalisations are sketched in part V of the paper.

To derive the short run effects on the welfare of the two household types of an increase in the price of good 2, we totally differentiate equations (5) and (6) with respect to \(p_2\), holding \(n\) fixed. This determines the effect of \(p_2\) upon the utility levels of the two households. The outcome gives rise to the following proposition.

**Proposition 1:** Assume the model of monopolistic competition described by equations (1) to (6), with the number of firms fixed. (a) Then, an increase in the price of product 2 leads to a reduction in welfare for household type 1, while household type 2 gains if \(X_2 > C_2^2\). If \(C_2^2 > X_2\), household type 2 may gain or lose, i.e., there may be a Pareto deterioration in welfare. (b) If the increase in the price of good 2 has an ultra-anticompetitive effect (\(\partial mr(p_2)/\partial p_2 = 0\)), then household type 2 gains if and only if \(X_2 \geq C_2^2\).

**Proof:** Differentiation of equation (5) yields the result that

\[
H_1 \frac{\partial E}{\partial u_1} du_1 = \left( V_1 \frac{\partial w_1}{\partial mr_2} \frac{\partial mr_2}{\partial p_2} - C_2^1 \right) dp_2,
\]

where \(C_2^1 = H_1 \frac{\partial E}{\partial G} \frac{\partial G}{\partial p_2} > 0\) is the consumption of good 2 by household 1. Since we assume that industry 2 is factor 2 intensive (whence \(\frac{\partial w_1}{\partial mr_2} < 0\) ) and that \(\frac{\partial mr_2}{\partial p_2} \geq 0\) it is evident that

\[
\left( V_1 \frac{\partial w_1}{\partial mr_2} \frac{\partial mr_2}{\partial p_2} - C_2^1 \right) < 0 \text{ and hence that } du_1 / dp_2 < 0.
\]

\(^{12}\) We show in part V of the paper how this assumption can be relaxed. See, also, footnote 7.
A similar differentiation of equation (6) yields

\[ H_2 \frac{\partial E}{\partial u_2} du_2 = V_2 dw_2 + \left[ p_2 - MR_2 (p_2) \right] dX_2 - X_2 \frac{\partial mr_2}{\partial p_2} dp_2 + \left( X_2 - C_2^2 \right) dp_2, \]  

(13)

where \( \frac{dw_2}{dp_2} = \frac{\partial w_2}{\partial mr_2} \frac{\partial mr_2}{\partial p_2} > 0 \) and \( \frac{dX_2}{dp_2} = \frac{\partial X_2}{\partial mr_2} \frac{\partial mr_2}{\partial p_2} > 0 \). Thus, an inspection of expression (13) shows that the first three terms on the right hand side are positive. Accordingly, a sufficient condition for the right hand side to be positive from an increase in the price of good 2 is that \( \left( X_2 - C_2^2 \right) > 0 \). In this case, it follows that \( \frac{du_2}{dp_2} > 0 \) as asserted in the proposition. When this condition does not hold, it is possible that \( \frac{du_2}{dp_2} < 0 \) and hence for both households to suffer a loss in welfare – a Pareto deterioration in welfare. This completes the proof of part (a) of the proposition.

Part (b) of Proposition 1 simply follows from setting \( \frac{\partial mr_2}{\partial p_2} = 0 \) in expression (13) and noting that \( dw_2 = 0 \) and \( dX_2 = 0 \). Q.E.D.

The main general novel insight of Proposition 1 is clearcut. In contrast to the standard conclusion of the Stolper-Samuelson theorem in models with perfect competition, an increase in the price of good 2 may or may not be conflict generating between the two household types. This holds even though the assumption that firms are only owned by household type 2 creates the potential for conflict generation. More specifically, recalling that household type 2 produces and consumes good 2, Proposition 2 highlights that, unlike in the standard Stolper-Samuelson theorem under perfect competition, the welfare effects on household type 2
depend crucially on the consumption pattern of household type 2. We refer to the latter as the Weymark effect, see Weymark (1979, page 177).\footnote{The Weymark effect essentially states that Pareto improving product price changes are possible if there exists at least one (possibly composite) product for which all households have a net demand or supply.} Refer to Woodland (1974) here also.

The other novel insight again follows directly from Proposition 2(b): the weight attached to the Weymark effect crucially depends upon the strength of the anticompetitive effect, i.e., the rise in the profit margin due to an increase in the price of good 2. This appears to be a counterintuitive result, but on reflection it is easy to understand. If the anticompetitive effect is very strong, then changes in the price of good 2 only have a minimal effect on factor prices. Therefore, they cannot but reduce the significance of the Stolper-Samuelson effect.

Before concluding this section, we briefly consider another special case of the model in which we adopt the assumption that $\frac{\partial \ln m_r}{\partial \ln p_2} = e_{MR_2, p_2} = 1$, i.e., that the profit margin is fixed. As is well known, a fixed profit margin is a standard assumption of a huge literature. Making this assumption and so setting $\frac{\partial m_r}{\partial p_2} = m_r / p_2$ and defining $\bar{X}_2 = \bar{V}_2 \partial \bar{w}_2 / \partial MR_2$, expression (13) may be re-expressed as

$$H_2 \frac{\partial E}{\partial u_2} du_2 = \left[ tX_2 \left( 1 + e_{X_2, MR_2} \right) + \left( \left( 1 - t \right) \bar{X}_2 - C_2^2 \right) \right] dp_2$$

(17)

where $t \equiv (p_2 - m_r) / p_2$ denotes the profit margin and $e_{X_2, MR_2} = \partial \ln X_2 / \partial \ln MR_2$.

The interpretation of expression (17) is straightforward. Note especially that there is a novel insight: there is again a Weymark effect but it assumes a somewhat different form, namely $\bar{X}_2 MR_2 / p_2 - C_2^2$. If the profit margin is very low, this expression approximates the result of models with perfect competition (e.g., Lloyd and Schweinberger (1997)). In the latter case,
the profit margin effect, which is captured by the first term on the right hand side of expression (17), clearly tends to zero as expected.

At this point it should be emphasized that the empirical significance of both types of Weymark effect depends crucially on the degree of aggregation or disaggregation of the analysis. At a high degree of aggregation (as in our model) one should expect that a negative Weymark effect is a real possibility. In more disaggregated models it would seem unrealistic that all the producers of a certain good consume more of the good than they produce. Therefore, our general conclusion from the short run analysis is that whilst there exists the theoretical possibility that both household types may lose from an increase in the price of good 2, empirical work may not confirm this possibility.

Can some of our results be generalised? This seems an important issue, which we now address briefly. A routine generalisation would be to assume that both household types have a claim on supernormal profits and that the shares of entitlement are exogenous. This seems trivial, since only a redefinition of the Weymark effects would be required to take care of this. A more interesting approach consists in endogenising the entitlement shares by introducing an effort function with entitlement shares as arguments. Still another possibility would be to allow for Nash bargaining to determine the shares. In that case, it is well known that the distribution of power within the firm is captured by the relative bargaining power of the owners of the firm and workers.\footnote{See Marin and Verdier (2008) for how to model the distribution of power inside a firm, making use of principal agency theory.}

Finally, generalisations to higher dimensions appear to be straightforward if both household types own all the types of factors (but in different proportions) and all the household endowment vectors lie within the diversification cone of the economy, see Lloyd and Schweinberger (1997). In the latter case, making use of the concept of output imputed to
household endowments (with various types of factors), one can readily derive the appropriately redefined Weymark effects.

IV The long run analysis

In this section, we analyse the long run implications of an increase in the price of product 2. First, we consider the effect of this price increase upon the number of firms in the monopolistically competitive production sector. In particular, we establish the necessary and sufficient conditions for a higher price to induce greater entrepreneurship via an increase in the number of firms, which is the intuitively plausible outcome. Second, we follow our main objective of the paper by examining the consequences of the price increase for the welfare of the two types of households. The focus, as in the short run section, is to determine whether the price increase generates income conflict between households.

Before moving to these two tasks, it is useful to rewrite equations (5)-(7) of the model as

\[ H_1 E(1, G(p_2, n), u_1) = w_1 V_1 \]  
\[ (5') \]

\[ H_2 E[1, G(p_2, n), u_2] = w_2 V_2 \]  
\[ (6') \]

\[ \pi(p_2, n, V_1, \tilde{V}_2) = \left[ p_2 - c_2 (w_1, w_2) \right] X_2 - w_2 \cdot b \cdot n = 0 \]  
\[ (7') \]

where, as before, \( X_i = X_i[1, MR_2(p_2), V_1, \tilde{V}_2] \) and \( w_i = w_i[1, MR_2(p_2)] \) are determined from equations (1)-(4).

It is observed that the right hand side of the budget constraint of household 2 now has no profits, since they are zero in the long run as specified in equation (7'). Household types 1 and 2 now appear symmetrically in the model. It is also noteworthy that the zero profit
condition (7') may be used to determine the number of firms, \( n \); then using this result, the utility levels are determined from equations (5') and (6').

**(a) The effect of a price increase on the number of firms**

To proceed, we totally differentiate equation (7') with respect to \( p_2 \) and \( n \), assuming that the economy is initially in a long run equilibrium. This yields the expression

\[
d\pi = (p_2 - c_2) dX_2 + X_2 \left( 1 - \frac{\partial MR_2}{\partial p_2} \right) dp_2 - w_2 b dn - bn dw_2 = 0,
\]

where the changes in output of good 2 and the price of skilled labour are given by

\[
dX_2 = \frac{\partial X_2}{\partial MR_2} dp_2 - \frac{\partial X_2}{\partial V_2} b dn,
\]

\[
dw_2 = \frac{\partial w_2}{\partial MR_2} dp_2.
\]

This may be rewritten as

\[
b \left[ w_2 + (p_2 - c_2) \frac{\partial X_2}{\partial V_2} \right] dn = \left[ (p_2 - c_2) \frac{\partial X_2}{\partial MR_2} \frac{\partial MR_2}{\partial p_2} + X_2 \left( 1 - \frac{\partial MR_2}{\partial p_2} \right) - b n \frac{\partial w_2}{\partial MR_2} \frac{\partial MR_2}{\partial p_2} \right] dp_2.
\]

It is evident that the coefficient of \( dn \) on the left hand side of this expression is positive under our assumption that product 2 uses factor 2 relatively intensively, since then \( \frac{\partial X_2}{\partial V_2} > 0 \).

However, the coefficient of \( dp_2 \) on the right hand side cannot be signed on the basis of our assumptions, leading to the conclusion that an increase in the world price of good 2 may either increase or decrease the number of domestic firms. The outcome depends on whether
an increase in the world price will increase or decrease profits, given the number of firms. Further assumptions are needed to pin down the response of the number of firms to the price increase.

Rewriting this expression in terms of relative changes and dividing by \( w_2 b n = (p_2 - c_2) X_2 \), we obtain the result that

\[
\frac{\hat{h}}{\hat{p}_2} = \frac{1}{1 + \varphi \varepsilon_{X_2, \frac{p_2}{w_2}}} \left[ \varepsilon_{X_2, MR_2} - \varepsilon_{w_2, MR_2} \right] \varepsilon_{MR_2, p_2} + \zeta \left( 1 - \frac{c_2}{p_2} \varepsilon_{MR_2, p_2} \right),
\]

(11)

where \( \varphi \equiv b n / \tilde{V}_2 > 0 \) and \( \zeta \equiv \left( 1 + \frac{c_2 X_2}{bn w_2} \right) = \frac{p_2 X_2}{bn w_2} > 0 \).

The economic interpretation of expression (11) is straightforward. The numerator of expression (11) consists of three effects: a standard output price effect that is positive, a standard Stolper-Samuelson effect that captures the increase in the cost of setting up firms due to the rise in the wage of skilled labour, and a profit margin effect that is weighted by the value productivity of all firms, i.e., \( \zeta = p_2 X_2 / bn w_2 \).\(^{15}\)

The distinctive feature of the denominator is a weighted Rybczynski effect. As is well known, the elasticity of output with respect to the relatively intensively used factor is greater than unity \( \varepsilon_{X_2, \frac{p_2}{w_2}} > 1 \), i.e., the standard magnification effect. The weight is given by \( bn / \tilde{V}_2 \), which may be greater, equal to or less than one, depending on the skilled labour intensity of the setting up of firms relative to production. It follows that the assumed mobility of skilled labour between entrepreneurial activities and production may either reinforce, leave unchanged, or diminish the standard magnification effect. Intuitively, a given \( \hat{p}_2 > 0 \) implies...

\(^{15}\)The value productivity of all firms can be interpreted as the gross economy rate of return from investing in the setting up of firms.
(ceteris paribus) a smaller \( \hat{n} \) if the entrepreneurial activity requires more skilled labour than does production. Clearly, in the latter case, the setting up of more firms whittles away more quickly the supernormal profits of the short run equilibrium.

Rearranging expression (11), we can derive a necessary and sufficient condition and two sufficient conditions for an increase in \( p_2 \) to entail an increase in the number of firms (and therefore varieties). These are specified in the following proposition.

**Proposition 2:** Assume that the production sector of a small open economy can be described by the equations (1) to (4) and (7). Further assume that the production of good 2 is intensive in factor 2 (skilled labour) relative to good 1.

(a) Then, an increase in the world market price of good 2 implies an increase in entrepreneurial activity (number of firms) if and only if
\[
\frac{\varepsilon_{w_2, MR_2}}{\varepsilon_{w_2, MR_2}} + \left( \frac{c_2}{p_2} \right) > 0. \tag{12}
\]

(b) Assuming that \( \varepsilon_{MR_2, P_2} = 1 \) (i.e., the profit margin is fixed) then an increase in \( p_2 \) entails an increase in the number of varieties \( n \) if
\[
\frac{p_2 - c_2(w_1, w_2)}{p_2} > \left( \frac{p_2 - c_2}{p_2} \right) > 0. \tag{12}
\]

(c) Assuming that \( \varepsilon_{MR_2, P_2} = 0 \), then an increase in \( p_2 \) generates an anticompetitive effect (rise in the profit margin) such that there is an increase in the number of varieties \( n \).

**Proof:** See the derivation of expression (11). Q.E.D.

Proposition 2 (a) highlights the importance of the gross economy rate of return \( \frac{p_2 X_2}{b w_2 n} \) obtained from investing in the setting up of firms. Generally speaking, Proposition 1(a) shows that even if \( \varepsilon_{w_2, MR_2} > \varepsilon_{X_2, MR_2} \) there may be an incentive for skilled labour to move from production to the setting up of firms if the gross economy rate of return is high enough.

Propositions 2(b) and (c) focus on the importance of the profit margin effect in relation to the Stolper-Samuelson effect and to the output price effect. In particular, note that if \( \varepsilon_{MR_2, P_2} = 0 \),
i.e., the profit margin effect is ultra-anticompetitive (see the first benchmark case mentioned before), then \( \dot{n} > 0 \).

Proposition 2(b) is interesting because it generalises the result of the received literature by focussing on the crucial role played by the Stolper-Samuelson effect. Clearly, we have unearthed here a hitherto ignored interdependence between entrepreneurial activities and conflict generating effects of product price changes.

To conclude, note that we assume throughout the remainder of the paper that the conditions implying an increase of \( n \) (in Proposition 2) in response to an increase in the world price for good 2 are satisfied.

\[ (b) \textbf{The effect of a price increase on the welfare of households} \]

Can there be gains from trade in the sense of a Pareto improvement in an economy with many different household types without governmental intervention? This key issue in international economics has received considerable attention (making use of models of perfect competition) in the received literature. To be more specific, until the work by Dixit and Norman (1980) it was argued that a Pareto improvement is only possible if the government applies a system of lump sum transfers between household types. Dixit and Norman (op.cit) were the first to prove that an appropriate set of employment and commodity taxes and subsidies are, subject to certain assumptions, sufficient to ensure a Pareto improvement. Our contention in this paper is that an important but overlooked key insight of the new trade theory is that Pareto improvements are a real possibility in economies with many household types and monopolistic competition even without any form of governmental intervention.

In this context we want to argue that regrettably in much of the received trade theory featuring various types of general equilibrium models of imperfect competition distributional
issues have been relatively neglected even though they obviously play a key role in many policy decisions in advanced countries.\textsuperscript{16} Equally important, by focussing mainly on the non-comparative advantage elements of possible gains from opening up a country to international trade, the interdependence between the price effects (associated with comparative advantage) and the possible gains due to non-comparative advantage have become blurred. The latter statement applies \textit{a fortiori} to models with imperfect competition and many different household types (and distributional issues).

Our main task in part IV is to derive a set of simple empirically testable conditions under which an increase in the price of good 2 implies a Pareto improvement in entrepreneurial economies. As is intuitively obvious, the concept of the marginal willingness to pay for an increase in the number of varieties, “the privately produced public good” plays a crucial role in this context. It may, of course, be argued (Neary (2004)) that the marginal willingness to pay for an increase in the number of varieties, declines very rapidly as the number of varieties rises. On the other hand, as mentioned in the introduction, in the light of recent overwhelming empirical evidence for the US economy (Broda and Weinstein (2006)) an increase in the number of varieties should be regarded as a very important source of gains from trade.

We now proceed to prove the following preliminary result: changes in the number of firms (varieties) have no effect on the income of household type 2 (skilled labour) provided that both goods are produced and product prices remain unchanged. To this end we denote the income of skilled labour by $Y_{2}$.

\begin{equation}
Y_{2} = w_{2} \left[ 1, MR_{2} (p_{2}) \right] X_{2} + \left[ p_{2} - MR_{2} (p_{2}) \right] X_{2} \tag{18}
\end{equation}

Differentiating (18) totally with respect to $n$ (keeping prices fixed) we have:

\textsuperscript{16} In fairness it should be noted that there are some exceptions see e.g.: Eaton and Lipsey (1989).
Differentiating totally the long run equilibrium condition, equation (7), we readily obtain that:

\[ \left[p_2 - MR_2(p_2)\right] \frac{\partial X_2(\cdot)}{\partial n} dn = w_2 bdn \]  

(20)

hence: \( dY_2 / dn = 0 \)  

(21)

In deriving expression (21) we have assumed that before and after the change in \( n \) both goods are produced.

Changes in \( n \) (for given product prices) clearly do not affect the incomes of household types 1 and 2 in the long run equilibrium. On the other hand, the presumption arises that comparing long run equilibria an increase in the price of good 2 may raise the utility of both household types if it entails an increase in entrepreneurial activity, i.e., a reallocation of skilled labour from production to the setting up of more firms.

In order to prove under which conditions the said presumption is supported by the model and its assumptions we now totally differentiate the income expenditure equalities of household types 2 and 1, see equations (5) and (6) with respect to \( p_2 \) and \( n \). This yields:

\[ p_2 C_2^2 \hat{p}_2 + H_2 \frac{\partial E}{\partial n} dn + H_2 \frac{\partial E}{\partial u_2} du_2 = p_2 X_2 \hat{p}_2 + [p_2 - MR_2(p_2)]X_2 \varepsilon_{MR,p_2} \hat{p}_2 \]

\[ + \varepsilon_{MR,p_2} \left( w_2 \tilde{V}_2 \varepsilon_{w_2,MR} - MR_2 X_2 \right) \hat{p}_2 \]  

(22)

\[ p_2 C_2^1 \hat{p}_2 + H_1 \frac{\partial E}{\partial n} dn + H_1 \frac{\partial E}{\partial u_1} du_1 = w_1 V_1 \varepsilon_{w_1,MR} \varepsilon_{MR,p_2} \hat{p}_2 \]  

(23)
where: $\frac{\partial E}{\partial n}$ denotes the marginal willingness to pay for an increase in the number of varieties and $\frac{\partial E}{\partial n} < 0$.

$C_2^2$ and $C_2^1$ stand for the aggregate consumption of good 2 of household types 2 and 1 respectively.

Obviously we can see from equation (22) that household type 2 gains provided that $X_2 > C_2^2$, see Proposition 2.

We now focus on the long run effects on household type 1. The issue is clearcut: under which conditions can the long run gains due to an increase in the number of varieties more than offset the income and consumption loss owing to a fall in the wage of unskilled labour and the increase in the price of good 2?

In order to obtain insights we now substitute equation (11) into equation (23). The resulting equation can readily be solved for $H_1 \frac{\partial E}{\partial u_1}$. The solution for the latter expression gives rise to the following Proposition 3.

**Proposition 3**

Assume that a small open economy with two household types can be modelled by the set of equations (1) to (7). Further let the production of good 2 be intensive in skilled labour and that $X_2 > C_2^2$, i.e., total output of good 2 exceeds the aggregate consumption of good 2 by household type 2 (skilled labour).

Then an increase in the world market price of good 2 entails a Pareto improvement if:
(a) The short run growth in total profits $\text{SRGTP}$ exceeds the income losses of household type 1 (unskilled labour), $\text{ILH}_1$ and

(b) $-H_1 E_{E,a} > (1 + \varepsilon_{X_2,\beta_2} \phi)$

where: $\varepsilon_{E,a}$ denotes the marginal willingness of a household to pay for an increase in varieties in elasticity form. The short run growth in total profits is given by the numerator of expression (11) and the income loss of unskilled labour by: $\left( w_i V_i e_{w_i} e_{M_{R_2}, p_2} - p_2 e^{c_2}_i \right) \hat{p}_2$

Proof: having substituted equation (11) into equation (23) we obtain expression (24):

$$\left[ H_1 E_{E,a} \text{SRGTP} \right] \left( 1 + \varepsilon_{X_2,\beta_2} \phi \right) \hat{p}_2 + H_1 \frac{\partial E}{\partial u_i} du_i = \text{ILH}_1 \hat{p}_2$$

Proposition 3 parts (a) and (b) follow from expression (21) and a rearrangement of expression (24).

Q.E.D.

Proposition 3 yields a number of insights shedding light on the key issue addressed in this paper: could changes in product prices be conflict generating only in the short run but lead to a Pareto improvement in the long run? In deriving Proposition 3 we have assumed that the short (and long) run loss of unskilled labour is smaller than the short run growth in total profits. Subject to the latter assumption we arrive at a result which has a straightforward interpretation. In this context, as expected, the aggregate marginal willingness to pay for an increase in varieties plays a key part. As is obvious form part (b) of Proposition 3, it follows that, subject to the stated assumptions, an aggregate marginal willingness to pay for an increase in $n$ in excess of unity implies a Pareto improvement provided that the production of good 2 is very much more skilled labour intensive than the setting up of firms, i.e., $\phi$ is very small. This holds even if the production of good 2 is highly skilled labour intensive relative to good 1 and therefore the standard Rybczynski
effect is significant. On the other hand the standard Rybcynski effect is, of course, magnified if $\phi$ is very high, i.e., the setting up of firms is much more skilled labour intensive than production.

From an empirical point of view the main insight of Proposition 3 is that we have deduced a lower bound for the aggregate marginal willingness to pay for an increase in varieties which, subject to the assumptions of Proposition 3, implies a Pareto improvement. Note that the said lower bound is expressed solely in terms of observable and measurable parameters.

All these results accord with our intuition. Even if the income loss of household type 1 is very low relative to the short run growth in profits (accruing to skilled labour) the increase in $n$ may be small. This follows if the setting up of firms is very skilled labour intensive and therefore even a small increase in $n$ quickly whittles away total profits.

The reader is reminded that we have stated in Proposition 3 conditions for a Pareto improvement in the long run equilibrium because we believe that our simple modelling approach focussing on entrepreneurship may shed light on the stylised fact that in entrepreneurial economies (as in some countries of East Asia) vested interest groups and political motivation seem to play a relatively minor part (as compared with Europe). As mentioned before from the point of view of international political economy a key aim of our analysis has been to try to endogenise the existence or absence of vested interest groups.\textsuperscript{17}

\textsuperscript{17} At this point it should be pointed out that there possibly exists a relationship between the skilled labour intensity of production relative to the setting up of firms and the skilled labour intensity of production (of good 2 relative to good 1). The interested reader may consult empirical work on this important issue, see Bustos (2005) and Helpman (2006, page 597).
Finally we should mention the following interesting interpretation of our model and
Proposition 3. As is well known, there exists a huge literature on Pareto improving
transfers between countries and agents within a country, see e.g.: Woodland and Turunen-
Red (1988). It should be noted that the setting up of more firms and the implicit increase
in the number of varieties can be regarded as the provision of an incentive compatible
income transfer from the owners of firms (household type 2) to the owners of unskilled
labour (household type 1). This follows because the literature on the provision of public
goods tells us that an increased provision of public good is equivalent to an income
transfer if the public good is underprovided to the recipient household. Most importantly,
in our case, there is no need for governmental intervention except that there should be no
impediments to the entry of firms into an industry such as high licensing fees.\footnote{Actually in the real world the entry into an industry is heavily regulated in many countries, see Djankov et alii (2002). This may be explained in terms of political economy reasons, see Djankov et alii op.cit., or in terms of environmental policies.}

We now turn to the derivation of our final result of part IV. One of our benchmark cases,
as explained in the introduction, is based upon the assumption that the increase in the
world market price of good 2 may be ultra-anticompetitive. In the latter case, there are no
changes in factor prices and all adjustment is at the extensive margin, i.e., through the
entry of more firms into the industry. It is clear that in that case the welfare loss of
household type 1 only consists of the consumption loss. One may conjecture that
household type 1 gains from the increase in the world market price of good 2 provided
that the aggregate marginal willingness to pay for an increase in varieties is in excess of
the consumption loss.

Setting $\varepsilon_{MR_2, p_2}$ equal to zero in expression (24) and rearranging we readily arrive at the
following result.
Proposition 4

Assume that a small open economy with two household types can be modelled by the set of equations (1) to (7). Further let the increase in the world market price of good 2 have an ultra-anticompetitive effect. Moreover assume that the total production of good 2 exceeds the consumption of good 2 by household type 2 (skilled labour).

Then the increase in the price of good 2 entails a Pareto improvement if and only if:

\[-H_1 E_{\varepsilon,n} > p_2 C_2 \left( \frac{1 + \varepsilon_{x_2,\hat{\varphi}}}{1 + \frac{c_2(w)X_2}{w_2bn}} \right) \]

(25)

Proof: see the reasoning leading up to expression (25). Q.E.D.

Proposition 4 confirms our intuition but also yields a number of additional novel insights. To this end the attention of the reader is drawn to the coefficient of \( p_2 C_2 \) on the right hand side of expression (25). Clearly, the main insight is that the entrepreneurial activity results in a weighting of the consumption loss.

The weighted or effective consumption loss may exceed or fall short of the observed consumption loss. In particular it is easy to see that the weighted or effective consumption loss is lower than the observed consumption loss, \( p_2 C_2 \), if and only if:

\[ \frac{\tilde{V}_2}{bn} \cdot \frac{c_2(w)X_2}{w_2bn} \geq \varepsilon_{x_2,\hat{\varphi}} \]

(26)

The first term on the left hand side of expression (26), \( \frac{\tilde{V}_2}{bn} \), is a measure of the skilled labour intensity in production relative to the setting up of firms. The second term clearly stands for the net economy rate of return on investing in the setting up of firms in terms of
value added in production. Evidently expression (26) can only hold if the product of the said two terms exceeds unity. Undoubtedly only empirical work can confirm if expression (26) is satisfied in the real world in certain industries.

We conclude part IV with the following two observations.

First, note carefully that in one sense Proposition 4 is more general than Proposition 3. In deriving Proposition 3 we have assumed that the income loss of household type 1 is lower than the impact effect of an increase in the price of good 2 on profits. However Proposition 4 can also be applied if the latter is not the case.

Finally, it is interesting to note the crucial role played by the gross economy rate of return from investing in the setting up of firms, \( p_2 X_2 / w_2 bn \), in Proposition 2, see also expression (12), as well as in Proposition 4, i.e., \( 1 + c_2(w)X_2 / w_2 bn \). In a general sense this confirms our intuition. In order to obtain a Pareto improvement, the incentive for entrepreneurs to set up firms in terms of an appropriately defined private rate of return must be associated with a sufficient gross or net economy (or social) rate of return, see Propositions 2 and 4.

V Summary, conclusions and possible extensions

Why are vested interest groups which attempt to influence governmental decision making by means of political activities much less important in some countries than in others? Our tentative answer to that complex question is: because entrepreneurship (a high mobility of skilled labour between production and the setting up of firms) plays a much more important role in some countries (such as for example the P. R. of China) than in others (such as Europe). Many governmental policies entail conflict generating product and factor price changes. However in the presence of entrepreneurship the possibly
anticompetitive effects of product price changes create incentives for entrepreneurial activities. The entry of more firms and the production of more varieties may in the long run, subject to certain assumptions (see Propositions 3 and 4), imply a welfare gain for all households (owners of firms and workers) which more than offsets the effect of conflict generating price changes in the short run.

We have shown that in order to obtain the latter result three factors are crucial:

(a) All rent (surplus) of the short run equilibrium accrues only to the entrepreneurs (owners of firms). Generally speaking, we have shown that, given an increase in the price of good 2 (the good produced under monopolistic competition), an increase in the output of good 2 at the intensive margin generates conflict between the owners of firms and workers, but the converse holds for an increase in output of good 2 at the extensive margin.

(b) Paradoxically, the stronger the anticompetitive effect of product price changes in the short run the higher the probability that in the long run product price changes lead to a Pareto improvement.

(c) Assume that the good produced under monopolistic competition is skilled labour intensive relative to the good produced under perfect competition. Then the lower the skilled labour intensity of the setting up of firms relative to the skilled labour intensity of production, the more likely is a Pareto improvement in the long run.

As expected, the economy and private rates of return on investment earned from the setting up of firms are also of paramount importance, see Propositions 2 and 4. Furthermore, not surprisingly, the magnitude of an appropriately defined aggregate marginal willingness to pay for an increase in varieties on the part of consumers plays a crucial part in ensuring a Pareto improvement. To clarify this, we have derived lower bounds to the said marginal willingness
to pay which are consistent with a Pareto improvement and expressed purely in terms of observable and measurable parameters.

Our short and long run results have the following interesting economic interpretation. Subject to our assumptions, see Propositions 1 to 4, product price changes which are conflict generating between the owners of firms and unskilled workers in the short run imply in the long run a Pareto improving and incentive compatible transfer from the owners of firms to workers without any form of governmental intervention. This sheds new light on the possibility of implementing Pareto improving transfers by governments in multi-household and multi-country modelling frameworks. The latter, as is well known, is the topic of a huge literature, see e.g.: Woodland and Turunen-Red (1988).

There are many worthwhile extensions. First and foremost, the highly restrictive assumption that all rents of the short run equilibrium accrue only to the owners of firms should be relaxed. It is well known that many firms have policies of profit sharing. On the one hand, profit sharing should have an effort raising effect. On the other hand, one should not neglect the possibility that it could also act as a disincentive to entrepreneurship. Generally speaking we are addressing here a fundamental issue: which distributions of power within a firm are socially desirable? As is well known, the distribution of power within the firm is a very active and topical research area, see Marin and Verdier (2008).

Finally, note that we are not arguing that the beneficial effects of entrepreneurial activity always welfare dominate the sources of conflict generation, such as the selection effect, emphasized in the recent models with heterogeneous firms. This is an unresolved issue which should be analysed in a model which allows for entrepreneurship (in the sense of our model) as well as heterogeneous firms. Undoubtedly in the latter context a real world relevant
modelling approach must also take full account of the distribution of power within the firm and the interaction of the latter with the markets and the government.

References:


