CENTRE for ECONOMIC PERFORMANCE

CEP Discussion Paper No 800

June 2007

Protection for Sale Made Easy

Richard E. Baldwin and Frédéric Robert-Nicoud

LSE THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Abstract
Formal analysis of the political economy of trade policy was substantially redirected by the appearance of Gene Grossman and Elhanan Helpman's 1994 paper, "Protection for Sale". Before that article a fairly wide range of approaches were favoured by various authors on various issues, but afterwards, the vast majority of theoretical tracts on endogenous trade policy have used the Protection for Sale framework (PFS for short) as their main vehicle. The reason, of course, is that the framework is both respectable – because its microfoundations are distinctly firmer than were those of the earlier lobbying approaches – and it is very easy to work with. Despite the popularity of the PFS framework, it appears that no one has presented a simple diagram that illustrates how the PFS frameworks and explains why it is so easy. This short note aims to remedy that ommission.

JEL Classifications: H32, P16
Keywords: protection for sale, endogenous protection.

This paper was produced as part of the Centre's Globalisation Programme. The Centre for Economic Performance is financed by the Economic and Social Research Council.

Acknowledgements
Richard Baldwin is a Professor of International Economics at the Graduate Institute of International Studies. He is also the Policy Director of the CEPR and affiliated to the NBER; http://heiwww.unige.ch/~baldwin Frédéric Robert-Nicoud is an Associate of the Centre for Economic Performance and Career- Track Lecturer in Economic Geography at the London School of Economics. He is also a CEPR Research Affiliate and Associate Editor of the Journal of Regional Science and Urban Economics; http://personal.lse.ac.uk/robertni/

Published by
Centre for Economic Performance
London School of Economics and Political Science
Houghton Street
London WC2A 2AE

ISBN 978 0 85328 177 1

1. Introduction and Motivation

Formal analysis of the political economy of trade policy was substantially redirected by the appearance of Gene Grossman and Elhanan Helpman's 1994 paper, "Protection for Sale" in the American Economic Review (Grossman and Helpman, 1994). Before that article, a fairly wide range of approaches were favoured by various authors on various issues; see, for example the political support function approach of Hillman (1989) and Long and Vousden (1991), and the formal lobbying approach of Findlay and Wellisz, (1982). After the article, the vast majority of theoretical tracts on endogenous trade policy have used the Protection for Sale framework (PFS for short) as their main vehicle. The reason, of course, is that the framework is both respectable – because its microfoundations are distinctly firmer than were those of the earlier lobbying approaches – and it is very easy to work with.

Despite the popularity of the PFS framework, it appears that no one has presented a simple diagram that illustrates how the PFS framework works and explains why it is so easy. That is the goal of this short note.

2. The PFS Framework with Equations

The PFS framework is firmly in the so-called lobbying approach to endogenous trade policy (as opposed to the voting approach). As such, it abstracts from electoral politics, assuming instead that the government is entrenched or at least that every elected government will respond to lobbying in the same way.

Specifically, we model lobbying as a menu auction (Bernheim and Whinston, 1986), and we assume that all industrial sectors are perfectly organised in the Grossman-Helpman sense (i.e. all firms in a sector act as one when it comes to political contributions). Contributions made by sector-m are denoted as C_m. Consumers and the untaxed A-sector are unorganised and thus do not lobby.

2.1 Underlying economy (almost partial equilibrium)

To focus on the political economy aspects, the PFS framework assumes an extremely simple underlying economy.

The PFS framework assumes preferences of all factor owners are identical and quasilinear so as to eliminate general equilibrium considerations stemming from income effects. It also assumes preferences are separable sector-by-sector so as to eliminate cross-price effects on demand. Symbolically, the typical direct utility function and corresponding indirect utility function are:

(1) $$u = c_0 + \sum_{i=1}^{n} u_i[c_i], \quad v = E + \sum_{i=1}^{n} s_i[p_i]$$

where n is the number of non-numeraire sectors, the u_i sub-utility functions for each non-numeraire sector, E is expenditure, and $s_i(p_i)$ are sector-specific consumer surplus functions.

For the direct utility function, u, c_0 is consumption of the numeraire good and c_j is consumption of typical good j. One of the many nice features of the almost-partial-

equilibrium demand structure is that consumer surplus perfectly captures the welfare impact of price changes. Indeed, the typical indirect utility function is just income, denoted as E, plus the sum of sector-specific consumer surplus measures, $s_i(p_i)$.

To simplify things on the supply side, the PFS model adopts a Ricardo-Viner set-up. This eliminates general equilibrium supply-side effects because labour's price is pinned down by productivity in the numeraire sector and each sector-specific factor is paid the Ricardian rent. This means that E for a typical consumer equals her labour income wL plus her share of tariff revenue, r, plus the payment to whatever sector-specific factors she owns.

Finally, to further simplify the underlying economy, the original PFS framework adopts the small-country fiction, that is, the border prices the nation faces are unrelated to the volume of the nation's purchases and sales.

2.2 Government's objective, lobbies and contributions

In the PFS framework (see Grossman and Helpman 1994), the government's objective function Ω is a weighted sum of standard utilitarian social welfare function W, and lobbying contributions, namely:

(2) $$\Omega = aW + \Sigma_{j\in\Lambda} C_i[p_i]$$

where capital lambda, Λ, is the set of sectors that are organised politically (and thus can make political contributions) and C_i is the contribution of sector i.

One of the very nice features of the PFS framework is that it disciplines the range of contribution schedules. Specifically, it presents sophisticated reasoning from contract theory to argue that it is natural to expect each lobby's contribution to be 'truthful' in the sense that each lobby's contribution must vary with tariffs in the same way that the lobby's objective function varies tariffs. In particular, the form of the contribution schedule is exactly equal to the industry/lobby's welfare minus a constant, B.

Awkwardness in lobbyist's contribution schedules

Contributions in the PFS model are directly and intuitively related to what one might assume is the main purpose of lobbying – raising the price of goods that the industry sells by getting protection from low priced imports. However, the PFS model also has to confront an awkward implication of its assumption of identical preferences for all factor owners. In the general PFS case, lobbies care about more than just getting protection for the goods they sell. They also fine-tune their contributions in order to lower the cost of living facing lobby members. Namely, the PFS contributions are:

(3) $$C_i[p_i] = \pi_i[p_i] + \alpha_i N\big(r[p] + s[p] + L\big) - B_i$$

where π is total the Ricardian surplus earned by firms in sector i, N is the total mass of people in the nation, and α_i is the fraction of the population that owns the sector-specific asset of sector=i.

The first and third terms in (3) are sensible bits. Plainly, a lobby's contributions should be directly related to its rents, π_i, and since a sensible model would not require lobbies to contribute all their Ricardian rents to the government, the PFS framework

allows contributions to be reduced by a constant, B_i. This allows the lobby to retain some of the fruits of their lobbying without violating the truthfulness constraint.

The Ice Cream Clause. The second term in (3), however, is awkward. It is there since the PFS model assumes that lobbies maximise the utility of the owners of the industry-specific factor who are also consumers. This means that the contribution schedule includes elements of the owners' indirect utility function that involve prices in other sectors – specifically, the per-capita distribution of tariff revenue, r, the per capita consumer surplus, s, and the per capita labour endowment L. The awkwardness is twofold. First, it introduces a strange element to lobbyists' concerns, what might be called the 'ice cream' clause. For example, this implies that the steel lobby would slightly lower the amount of money it donates to the government for any given steel tariff if the government chooses a slightly higher ice cream tariff. This does not add to the model's appeal. Secondly, the awkward term is also responsible for most of the complexity in the general PFS framework. The reason is that it creates a general equilibrium connection among sectors in a model that is otherwise a juxtaposition of partial equilibrium markets.

Fortunately, this awkward term is multiplied by $\alpha_i N$, where α_i is the share of the population, N, that owns the industry-i specific factor. This is important since it allows one to remove the awkwardness by assuming that α_i is so small that it can be well approximated as zero. In this case, intuitively appealing case, a lobby's objective is to maximise the industry's producer surplus less lobbying costs.

The original Helpman-Grossman article calls this 'example 3' and notes that this assumption has a downside in that it eliminates 'political rivalry among special interest groups.' However, this is not much of a downside since the rivalry considered in the general PFS model is only of the 'ice cream clause' variety. Even the general PFS model fails to capture the sort of rivalry one often observes in OECD nations. For example, US carmakers resist US steel protection since it raises input costs. This is not captured by the general PFS model since a lobby only cares about protection in other sectors *due its impact on consumer prices and government tariff revenue*.

2.3 PFS-lite (Grossman-Helpman 1994 Example 3)

Under the appealing assumption that lobbies care only about rents (i.e. $\alpha_i=0$ for all i), the PFS framework is extremely simple. Indeed, the endogenous tariff can be solved market by market. In this, PFS-lite case, the government's objective function is identical to a 'politically realistic objective function' where the producer surplus of organised industries receives a higher weight in the government's maximisation problem.[1] Specifically, the weight on producer surplus in unorganised sectors as well as on consumer surplus and tariff revenue is 'a'; the weight on producer surplus in organised sectors is 1+a. Thus the government chooses tariffs to maximise:

$$\Omega = aN\left(r_i[p_i] + s_i[p_i]\right) + a\Sigma_{i\notin\Lambda}\pi_i[p_i] + (1+a)\Sigma_{i\in\Lambda}\pi_i[p_i] + CONSTANTS \quad \textbf{(4)}$$

This, of course, is exactly why the PFS framework is so easy to work with. It is, in essence, just a social welfare maximization exercise with a politically realistic social welfare function.

[1] See Baldwin (1987).

The first order condition for the choice of the tariff in typical sector that is organised is:

(5) $$0 = a\left(Nr_i'[p_i] + Ns_i'[p_i] + \pi_i'[p_i]\right) + \pi_i'[p_i]$$

Given the small-economy fiction, the derivatives here are simple. The change in tariff revenue, Nr', equals the level of imports plus the level of the tariff, τ_i, times the change in imports. That is,

(6) $$Nr_i'[p_i] = M_i + \tau_i \frac{dM_i}{dp_i}$$

Where M_i is sector-i imports and dM_i/dp_i is the change in imports in response to a domestic price change. As usual, the change in total consumer surplus is minus the level of consumption, and the change in producer surplus is the level of domestic production, namely:

(7) $$Ns_i'[p_i] = D_i; \qquad \pi_i'[p_i] = Z_i$$

where D_i and Z_i are consumption and production respectively.

Adding the first three terms and cancelling, we see that the parameter 'a' multiples a negative number; in particular the terms in the parentheses in (5) equal $\tau_i(dM_i/dp)<0$ which is identical to $\tau_i(dD_i/dp-Z_i/dp)$, where dD_i/dp and dZ_i/dp are the slopes of the domestic demand and supply curves respectively . We can think of this as the 'marginal economic cost of the tariff', or MEC for short, since it is the marginal reduction in utilitarian social welfare due to a rise in the tariff.

The fourth term in (5) is just the level of output, so it is positive and we refer to it as the 'marginal political benefit', or MPB, since it represents the marginal increase in contributions due a marginal increase in the tariff. Note that the MPB curve corresponds to the supply curve since the marginal increase in Ricardian rent is always equal to the level of domestic output.

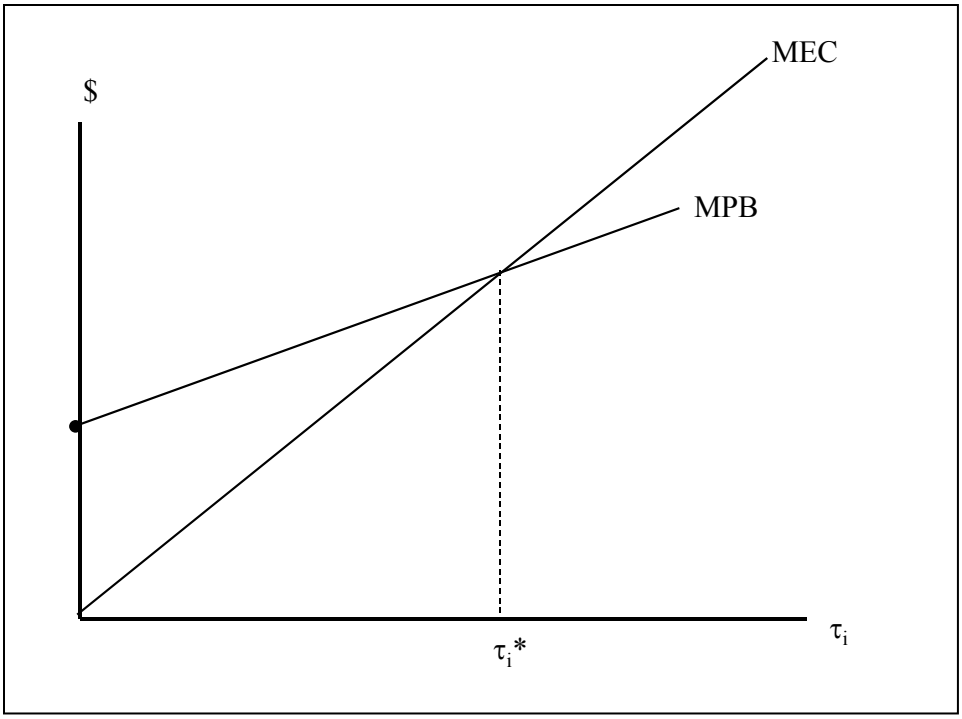
More specifically, tacking the demand curve as $D_i=a_D-b_Dp_i$ in sector-i and the supply curve as $Z_i=b_Sp_i$, where b_D is the slope of the demand curve and b_S as the slope of the supply curve in a given industry (we take them to be identical across industries to reduce notational clutter), we can rewrite (5) as:

(8) $$a\tau_i(b_D + b_S) = b_S(p_i^w + \tau_i)$$

where the left-hand side is the MPC and the right-hand side the MPB. Solving, we get the specific tariff as a fraction of the world price to be:

(9) $$\frac{\tau_i}{p_i^w} = \frac{b_S}{a(b_D + b_S) - b_S}$$

Figure 1: The political equilibrium tariff in the PFS-lite model



The MEC and MPB curves are plotted in Figure 1. The MPB curve is upward sloped and in fact is identical to the domestic supply curve. The MEC curve, $-a\tau_i(-D_p+Z_p)$, starts from zero (since the marginal economic loss from rising the tariff from zero is zero) and it rises as long as the slopes of the domestic supply and demand curve do not change too much. In fact, there is no cost, in terms of foregone insight, to assuming that the supply and demand curves are linear, in which case the MEC curve is a positively sloped linear curve as shown in the figure.

2.4 Determining the contributions

One of the most recalcitrant implications of the abovementioned 'ice cream clause' in the general PFS model is the difficulty it imparts into the determination of the level of contributions, in particular, the B_i's. The procedure for determining the B's in the special case of two lobbies is laid out in detail in the published article (Grossman and Helpman 1994) and the general procedure is laid out in the working paper referred to therein. Despite two figures and an extensive discussion in the published article, it is probably fair to say that the procedure remains a mystery to most readers. By contrast, determining B_i in the PFS model without the 'ice cream clause' is trivial.

It helps to remember that the PFS model is, in its essence, applied contract theory. The lobbies present the government with 'incentive contracts' called 'contribution schedules' that induce the government to do what the industry/lobbies want the government to do. In contract theory, one usually uses two expressions to characterise to optimal contract, the incentive constraint (the agent's first order condition taking the contract as given), and the participation constraint (the requirement that the expected reward is generous enough to induce the agent to accept the contract in the first place). In

the PFS setting, the assumption of truthfulness dictates the form of the contract, so (5) is the incentive constraint. But what is the participation constraint? Although this point is not clearly laid out in the PFS framework, one has to assume that the government has the right to refuse contribution schedules. This assumption, which is implicit in 'example 3', implies that the lobby must ensure that the level of the government's payoff is at least as high when it accepts contributions as when it does not. If the government refuses the contribution schedule from the industry/lobby in sector i, its optimal tariff choice is zero, this being a small nation. Consequently, the lobby must ensure that B is such that the government's payoff is equal to its reservation payoff, namely 'a' times social welfare under free trade.

Graphically, the size of the net contribution in industry i must equal the dead-weight loss triangles in the standard tariff diagram. We note that these increase with the square of the tariff, but since the tariffs lead to a first-order large transfer to the industry/lobby regardless of the tariff level, but the net payments to the government are second-order small for small tariffs, we know that an organised industry/lobby will always choose to offer the contract to its agent, the government.

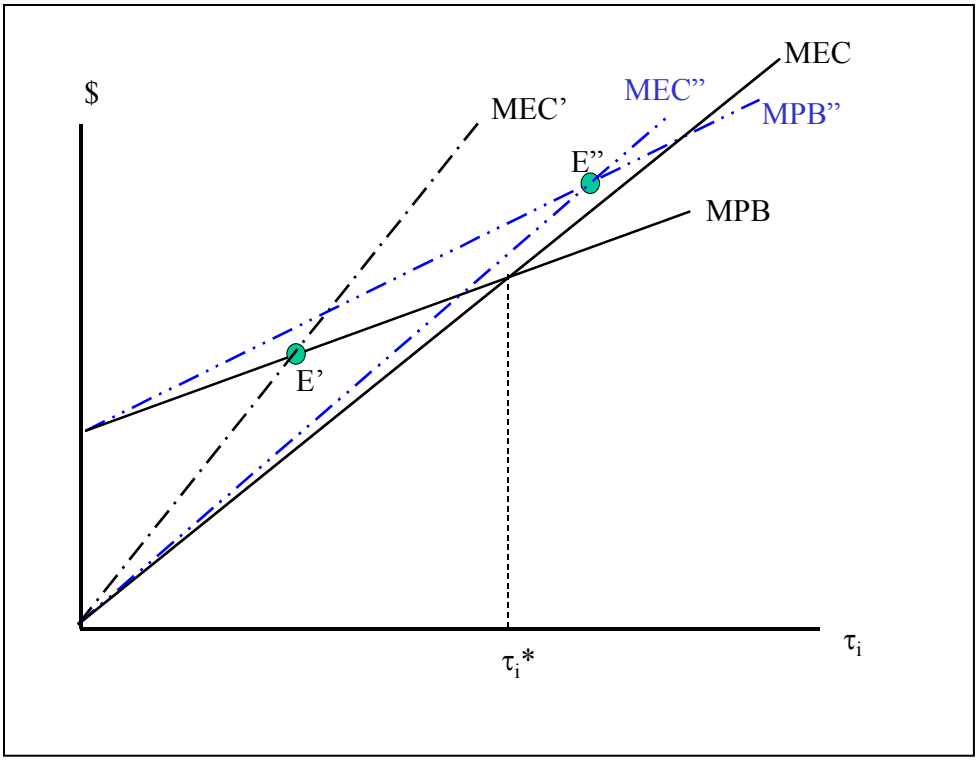
3. Comparative Statics

The standard comparative statics in the PFS framework involve changes in the political system – all of which are embodied in the parameter 'a' – and changes in the size of the industry.

If the government becomes more concerned with welfare compared to contributions, 'a' rises. In Figure 1 this shows up as a shift up in the MEC to MEC' (see Figure 2 for details). As expected, this reduces the endogenous tariff since the new intersection is at E'.

An increase in the size of the industry is captured in the PFS framework as a shift out in the domestic supply curve. In this simple implementation here, this amounts to a rise in the slope of the supply curve, namely, b_S. This shifts up both the MPB and the MEC, but it shifts up the MPB by proportionally more, so the equilibrium tariff is given by point E", i.e. it is higher.

Figure 2: The political equilibrium tariff in the PFS-lite model



References

Baldwin, R. E. (1987), 'Politically Realistic Objective Functions and Trade Policy: PROFs and Tariffs', Economic Letters, vol. 24, pages 287-290.

Bernheim, D. B. and Whinston, M. D. (1986), 'Menu Auctions, Resource Allocation, and Economic Influence', *Quarterly Journal of Economics*, vol. 101(1), pages 1-31.

Findlay, R., and Wellisz, S. (1982), 'Endogenous Tariffs, the Political Economy of Trade Restrictions, and Welfare', in J. Bhagwati (ed.), *Import Competition and Response*, Chicago: University of Chicago Press.

Grossman, G. M and Helpman, E. (1994), 'Protection for Sale', American Economic Review, vol. 84(4), pages 833-850.

Hillman, A. (1989), *The Political Economy of Protection*, Harwood Academic Publishers, Chur, London and New York (2nd printing 1994; 3rd printing 2001 London: Routledge).

Long, N. V. and Vousden, N. (1991), 'Protectionist Responses and Declining Industries', Journal of International Economics, vol. 30, pages 87-103.

CENTRE FOR ECONOMIC PERFORMANCE
Recent Discussion Papers

799	Alejandro Cuñat Marc J. Melitz	Volatility, Labor Market Flexibility, and the Pattern of Comparative Advantage
798	Giulia Faggio	Job Destruction, Job Creation and Unemployment in Transition Countries: What Can We Learn?
797	Nicholas Oulton	Chain Indices of the Cost of Living and the Path-Dependence Problem: an Empirical Solution
796	David Marsden Richard Belfield Salima Benhamou	Inventive Pay Systems and the Management of Human Resources in France and Great Britain
795	Andrew B. Bernard J. Bradford Jensen Stephen Redding Peter K. Schott	Firms in International Trade
794	Richard E. Baldwin Frédéric Robert-Nicoud	Offshoring: General Equilibrium Effects on Wages, Production and Trade
793	Alan Manning	Respect
792	Nick Bloom	Uncertainty and the Dynamics of R&D
791	Richard E. Baldwin Frédéric Robert-Nicoud	Entry and Asymmetric Lobbying: Why Governments Pick Losers
790	Alan Manning Sanchari Roy	Culture Clash or Culture Club? The Identity and Attitudes of Immigrants in Britain
789	Giorgio Gobbi Roberta Zizza	Does the Underground Economy Hold Back Financial Deepening? Evidence from the Italian Credit Market
788	Nick Bloom Raffaella Sadun John Van Reenen	Americans do I.T. better: US Multinationals and the Productivity Miracle
787	Elizabeth O. Ananat Guy Michaels	The Effect of Marital Breakup on the Income Distribution of Women with Children
786	Willem H. Buiter	Seigniorage
785	Gustavo Crespi Chiara Criscuolo Jonathan E. Haskel Matthew Slaughter	Productivity Growth, Knowledge Flows and Spillovers

784	Richard Layard Guy Mayraz Stephen Nickell	The Marginal Utility of Income
783	Gustavo Crespi Chiara Criscuolo Jonathan E. Haskel	Information Technology, Organisational Change and Productivity Growth: Evidence from UK Firms
782	Paul Castillo Carlos Montoro Vicente Tuesta	Inflation Premium and Oil Price Volatility
781	David Metcalf	Why Has the British National Minimum Wage Had Little or No Impact on Employment?
780	Carlos Montoro	Monetary Policy Committees and Interest Rate Smoothing
779	Sharon Belenzon Mark Schankerman	Harnessing Success: Determinants of University Technology Licensing Performance
778	Henry G. Overman Diego Puga Matthew A. Turner	Decomposing the Growth in Residential Land in the United States
777	Florence Kondylis	Conflict-Induced Displacement and Labour Market Outcomes: Evidence from Post-War Bosnia and Herzegovina
776	Willem H. Buiter	Is Numérairology the Future of Monetary Economics? *Unbundling numéraire and medium of exchange through a virtual currency and a shadow exchange rate*
775	Francesco Caselli Nicola Gennaioli	Economics and Politics of Alternative Institutional Reforms
774	Paul Willman Alex Bryson	Union Organization in Great Britain *Prepared for symposium for the Journal of Labor Research on "The State of Unions: A Global Perspective"*
773	Alan Manning	The Plant Size-Effect: Agglomeration and Monopsony in Labour Markets
772	Guy Michaels	The Effect of Trade on the Demand for Skill – Evidence from the Interstate Highway System
771	Gianluca Benigno Christoph Thoenissen	Consumption and Real Exchange Rates with Incomplete Markets and Non-Traded Goods
770	Michael Smart Daniel M. Sturm	Term Limits and Electoral Accountability

The Centre for Economic Performance Publications Unit
Tel 020 7955 7673 Fax 020 7955 7595 Email info@cep.lse.ac.uk
Web site http://cep.lse.ac.uk