ECONOMICS & POLITICS 0954-1985
Volume 16 November 2004 No. 3

INTERNATIONAL CAPITAL MOBILITY AND TRADE POLITICS: CAPITAL FLOWS, POLITICAL COALITIONS, AND LOBBYING

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Conventional wisdom holds that increasing international capital mobility reduces incentives for firms to lobby for trade protection. This paper argues that the effects of increased international capital mobility on the lobbying incentives of firms depend critically upon levels of *inter-industry* mobility. General-equilibrium analysis reveals that if capital is highly industry-specific, greater international mobility among *some* types of specific capital may increase lobbying incentives for owners of *other* specific factors and thereby intensify industry-based rent-seeking in trade politics. Evidence on levels of inward and outward investment in US manufacturing industries between 1982 and 1996, and on industry lobbying activities, indicate that these effects may be quite strong.

1. INTRODUCTION

THE VAST bulk of analysis of trade politics in the fields of political science and political economy still tends to rely upon standard models of international trade that assume that factors of production are immobile between economies.[1] In light of dramatically rising levels of foreign direct investment in recent decades and the rapid integration of international financial markets, due in some large measure to technological changes that have reduced the costs of investing at a distance, there has been a growing recognition of the need to think more seriously about the implications of international capital mobility (see Wong, 1995).[2] While a substantial theoretical literature has developed to address the ways tariffs (or even potential tariffs) may affect investment flows, and to study the welfare effects of different combinations of tariffs and taxes on investment, surprisingly little attention has been devoted to the issues of central concern to students of trade politics. Most

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[1]For surveys of the literature see Nelson (1988) and Rodrik (1995).

[2]Significant barriers to international capital movement remain, of course, as suggested by the high correlation between domestic savings and investment (Feldstein and Horioka, 1980; Penati and Dooley, 1984; Dooley et al., 1987; Bayoumi, 1990), real interest differentials across nations (Cumby and Obstfeld, 1984; Mishkin, 1984; Cumby and Mishkin, 1986), and the lack of international portfolio diversification (Adler and Dumas, 1983; French and Poterba, 1991). For a survey of the available evidence see Gordon and Bovenberg (1996).

importantly, to my knowledge, no existing analysis has applied a general-equilibrium framework to examine how an exogenous increase in international capital mobility alters the distributive effects of trade and, consequently, the key characteristics of trade politics – namely, which groups favor protection and how much effort such groups are willing to put into lobbying for their cause.

The conventional wisdom, to the extent that one exists, is that increasing levels of international capital mobility should reduce incentives among firms to lobby for protection and shift the balance of political support among business interests in favor of trade liberalization (e.g. Milner, 1988; Bhagwati, 1991, p. 329). This conclusion rests mainly on the standard Heckscher–Ohlin factor proportions model of trade and the famous "Mundell equivalency" which states that factor flows and trade are substitutes. An exogenous rise in international capital mobility will mean that any protectionist rents generated for local firms by trade barriers will be more quickly and thoroughly dissipated by cross-national capital flows. The consequences for trade politics thus seem clear: as capital becomes more international or "footloose" firms should have less incentive to lobby for trade protection; indeed, multinational firms themselves should become vocal advocates for freer trade. Recent research has found that inflows of foreign direct investment into the United States do seem to deter tariff-seeking by local firms – so-called "quid pro quo foreign investment" (see Bhagwati et al., 1987; Blonigen and Feenstra, 1996). In addition, it seems evident that US firms engaging in more outward foreign direct investment are themselves more supportive of trade liberalization (see Helleiner, 1977; Milner, 1988).

I argue here that the story is more complicated and less politically dramatic. The impact of higher levels of *international* capital mobility on the distributional effects of trade depends upon the degree of *inter-industry* capital mobility. If capital is highly industry-specific, increased international mobility among *some* types of specific capital may actually increase rent-seeking incentives among owners of *other* specific factors. The overall impact of the globalization of many types of production on support for freer trade is thus not necessarily positive. The next section develops a simple specific-factors model with international capital mobility. As in previous treatments, the focus here is on direct investment abroad rather than on flows of financial capital, since the latter respond to a variety of financial-market conditions and are less easily or directly connected to trade. Section 3 examines evidence on international capital mobility, comparing levels of inward and outward foreign direct investment in US manufacturing industries between 1982 and 1996. Section 4 provides some initial tests of the relationships between mobility and rent-seeking using data on corporate campaign contributions and petitions filed with the US International Trade Commission for anti-dumping and countervailing duties.

2. SPECIFIC FACTORS, TRADE, AND INTERNATIONAL CAPITAL MOBILITY

2.1 Literature

Early theoretical work on international capital movements applied the standard Heckscher–Ohlin factor proportions model of international trade and focused primarily on the welfare effects of capital flows and the optimal combinations of tariffs and taxes on investments (e.g. Jones, 1967; Kemp, 1969; Brecher and Feenstra, 1983).[3] The relationship between trade barriers and capital flows in this framework is very clear. The "Mundell equivalency" points out that factor flows and trade are substitutes: free factor movement should lead, just like free trade, to an equilibrium characterized by factor price equalization (see Mundell, 1957; Svensson, 1984).[4] The corollary is that any barrier to trade will encourage factor flows, rendering the protective measure less effective as a means of conferring distributive rents on local firms (see Krugman and Obstfeld, 1988, pp. 153–154; Wong, 1995, p. 102). Considerable attention has thus been devoted to the analysis of "tariff-jumping" investment (e.g. Hamada, 1974; Brecher and Diaz-Alejandro, 1977). More recent theoretical work has suggested that capital flows might not only jump newly-imposed tariffs *post facto*, but might also anticipate political pressure for tariffs and defuse it ahead of time by substituting for exports – so-called "quid pro quo foreign investment" (see Bhagwati et al., 1987; Dinopoulos, 1989).

Seen from this perspective as a generic phenomenon, the globalization of capital can be expected to have some rather profound political effects. In general, firms should have less incentive to lobby their governments for trade protection as capital becomes more internationally mobile (that is, as investment flows can serve more effectively as substitutes for trade flows). Empirical studies in this area have reported findings that do seem consistent with this general idea. There does appear to be evidence, for instance, that foreign firms increase direct investment in the United States in response to heightened protectionist threats, and that these new investments lead subsequently to a decline in protectionist demands by US firms (see Blonigen and Feenstra, 1996; Belderbos, 1997; Blonigen and Ohno, 1998).[5] In addition,

[3]The *distributional* effects of factor flows are straightforward in this framework: as long as commodity prices are exogenously determined, any change in the local supply of capital (or labor) will be reflected in a change in the country's output mix and factor returns are unaffected. This is the well-known "factor price insensitivity" result (see Leamer and Levinsohn, 1995). The result holds for any number of factors (n) used in the production of any number of traded commodities (m), and allowing for production of any number of non-traded commodities, as long as $n \leq m$ (specific factors models address cases in which $n > m$). The fixity of the prices of traded goods pins down the prices of the factors and non-traded goods (see Jones and Neary, 1984, p. 20; Ruffin, 1984, p. 261).

[4]At least as long as trade is generated by differences in endowments and not differences in tastes or technology (see Markusen, 1983).

[5]Goodman et al. (1996) point out that protectionist demands in each industry are also influenced by the preferences of the foreign investors themselves and these investors tend to favor

it seems clear that the firms engaging most actively in foreign direct investment are among the most ardent supporters of trade liberalization in general (see Helleiner, 1977; Milner, 1988).[6] Citing the general rise in investments abroad since 1945, Milner (1988) argued that this pattern helps explain why US trade policy remained relatively open in the 1970s despite trying economic circumstances – there was a general shift toward support for free trade as US firms became increasingly multinational. In a similar vein, Bhagwati (1991, pp. 330–331) has concluded that both actual foreign investment and the potential for foreign investment "are powerful forces that are influencing the political economy of tariff-making in favor of an open economy."

This conventional wisdom warrants much closer inspection. To the extent that it rests upon the standard Heckscher–Ohlin model of trade, which assumes complete mobility of factors between sectors in each economy, there is some reason for concern. The specificity of capital assets is a defining feature of multinational corporations, as Caves (1971, 1982) has pointed out: foreign investment typically involves the transfer of a bundle of very sector-specific assets – technology and equipment, managerial know-how, marketing techniques, and so on – from one production facility to another abroad.[7] Caves (1971) first applied the 2×3 Jones–Neary specific factors model to the analysis of international capital flows, and his work has been extended by others (e.g. Amano, 1977; Brecher and Findlay, 1983; Srinivasan, 1983; Neary and Ruane, 1988). Again, this theoretical analysis has focused primarily upon aggregate welfare effects of investment flows and welfare-optimizing combinations of tariffs and investment taxes.[8] To date,

greater liberalization when their investments are "import-complementing" rather than "import-substituting." Even in the latter instance, however, they admit that the potential for more investment by other foreign investors erodes incentives for seeking protection.

[6]Milner's (1988) detailed study of the policy preferences of US firms in several industries in the 1920s and 1970s reveals a strong association between outward investment and support for free trade.

[7]See also Batra and Ramachandran (1980, p. 278). The general notion that capital is quite immobile between sectors but increasingly mobile between economies has considerable empirical support. For discussions, see Caves (1971), Magee (1980), and Grossman and Levinsohn (1989). It should be noted that, to the extent that direct investment is driven by failures in markets for goods and knowledge and differences in intra- versus inter-firm transactions costs, it raises issues that cannot be treated adequately within a neoclassical framework. For increasing-returns models of multinational firms, see Helpman and Razin (1983), Helpman (1984), Helpman and Krugman (1985), Brecher and Choudhri (1996), and Grossman and Helpman (1996).

[8]The *distributional* effects of international capital flows are potentially far more interesting in the specific factors framework (than in the Heckscher–Ohlin model). If all goods are traded, so that prices are fixed in world markets, it can be shown that inflows of *any* type of specific capital will lower real returns for *all* owners of capital (the losses being larger for those who own the same type of specific capital that is entering the economy). But these distributive effects can be affected by the inclusion of non-traded goods in the model: if incoming investment leads to a reduction in the price of non-traded goods (i.e. if it raises the output of such goods more rapidly than it raises aggregate demand for them), it is unclear whether any local owners of capital will be worse off in real terms (the outcome will depend in part on their consumption tastes).

this general-equilibrium framework has not been used to examine the issues of central concern to students of trade politics. In particular, the specific factors model has not been adapted to examine how an exogenous increase in the international mobility of one or more types of sector-specific capital might alter the distributive effects of trade and, consequently, the incentives that different groups have to engage in protectionist rent-seeking. This is the approach I take below.

2.2 *The Specific Factors Model with International Capital Mobility*

Consider the two-commodity, three-factor model examined by Jones (1971). Consider an economy ("home") in which two commodities, X_1 and X_2, are produced, and sector i uses a factor specific to it, K_i, and a mobile factor shared with the other sector, L. Equilibrium is described by full employment of each factor [equations (1) to (3)], and competitive profits [equations (4) and (5)]:

$$a_{K1}X_1 = K_1, \tag{1}$$

$$a_{K2}X_2 = K_2, \tag{2}$$

$$a_{L1}X_1 + a_{L2}X_2 = L, \tag{3}$$

$$a_{K1}r_1 + a_{L1}w = P_1, \tag{4}$$

$$a_{K2}r_2 + a_{L2}w = P_2. \tag{5}$$

where a_{Ki} and a_{Li} are the quantities of K_i and L required per unit output of X_i, w and r_i are returns to labor and capital in each industry, and P_i are commodity prices. Full employment requires that techniques of production are variable and, since competition ensures that unit costs are minimized, each a_{Ki} and a_{Li} depends upon the ratio of factor prices in each industry. Solving equations (1) and (2) for X_1 and X_2 leaves a set of three equations in three unknown factor prices. Commodity prices are considered exogenous here, determined by world supply and demand and government policies such as tariffs.

So far this is just following the standard Jones derivation. Now assume that while endowments of L and K_2 are fixed exogenously (there is zero international mobility in these factors), K_1 can move between the "home" economy and the "foreign" economy (i.e. the rest of the world). The total world endowment of the factor, $K_1^w = K_1 + K_1^*$ (where the asterisk denotes foreign), is fixed exogenously, but the ratio K_1/K_1^* responds positively to relative returns, r_1/r_1^*. Capital mobility is thus not assumed to be perfect, as in previous treatments, but is defined in terms of an elasticity of substitution, m_{K1}, along a transformation loci connecting K_1 and K_1^*:

$$m_{K1} = \frac{\dfrac{d(K_1/K_1^*)}{K_1/K_1^*}}{\dfrac{d(r_1/r_1^*)}{r_1/r_1^*}}. \tag{6}$$

The nice thing about this simple specification is that international mobility is included in the model as a parameter that may vary along a continuum, while allowing for differences in mobility across different types of specific capital (i.e. across sectors). After differentiating totally, and substituting for m_{K1}, we derive the following amended form of the classic Jones solutions, which express changes in factor prices as a function of changes in commodity prices:

$$\hat{r}_1 = \frac{1}{\Delta}\left\{\left[\lambda_{L1}\frac{\sigma_1}{\theta_{K1}} + \frac{1}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}}\right]\hat{P}_1 - \frac{\theta_{L1}}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}}\hat{P}_2 - \frac{\theta_{L1}}{\theta_{K1}}\lambda_{L1}\frac{K_1^*}{K_1^W}(\hat{r}_1 - \hat{r}_1^*)m_{K1}\right\}, \tag{7}$$

$$\hat{r}_2 = \frac{1}{\Delta}\left\{\left[\lambda_{L2}\frac{\sigma_2}{\theta_{K2}} + \frac{1}{\theta_{K2}}\lambda_{L1}\frac{\sigma_1}{\theta_{K1}}\right]\hat{P}_2 - \frac{\theta_{L2}}{\theta_{K2}}\lambda_{L1}\frac{\sigma_1}{\theta_{K1}}\hat{P}_1 - \frac{\theta_{L2}}{\theta_{K2}}\lambda_{L1}\frac{K_1^*}{K_1^W}(\hat{r}_1 - \hat{r}_1^*)m_{K1}\right\}, \tag{8}$$

$$\hat{w} = \frac{1}{\Delta}\left\{\lambda_{L1}\frac{\sigma_1}{\theta_{K1}}\hat{P}_1 + \lambda_{L2}\frac{\sigma_2}{\theta_{K2}}\hat{P}_2 + \lambda_{L1}\frac{K_1^*}{K_1^W}(\hat{r}_1 - \hat{r}_1^*)m_{K1}\right\}, \tag{9}$$

where $\Delta = \lambda_{L1}(\sigma_1/\theta_{K1}) + \lambda_{L2}(\sigma_2/\theta_{K2}) > 0$, θ_{Ki} and θ_{Li} are the distributive shares of K_i and L in the value of output of industry i, λ_{Ki} and λ_{Li} are the fractions of total capital and labor in each industry, σ_i is the elasticity of substitution between labor and capital in industry i, and "hats" indicate proportional changes.

Now, we can write a mirror image of (7) that describes the change in r_1^* in the foreign economy, providing us with four equations in four unknowns. Solving yields the new solutions for changes in equilibrium factor returns in the home economy:

$$\hat{r}_1 = \frac{1}{(\Pi - \Phi)}\left\{\left[\lambda_{L1}\frac{\sigma_1}{\theta_{K1}} + \frac{1}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}}\right]\hat{P}_1 - \frac{\theta_{L1}}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}}\hat{P}_2\right\}, \tag{10}$$

$$\hat{r}_2 = \frac{1}{\Delta(\Pi-\Phi)\Pi^*} \times \left\{ \left[\left(\lambda_{L2}\frac{\sigma_2}{\theta_{K2}} + \frac{1}{\theta_{K1}}\lambda_{L1}\frac{\sigma_1}{\theta_{K1}} \right)(\Pi-\Phi)\Pi^* + \frac{\theta_{L2}}{\theta_{K2}}\lambda_{L1}\frac{\theta_{L1}}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}}\Delta^*\frac{K_1^*}{K_1^w}m_{K1} \right]\hat{P}_2 - \left[\frac{\theta_{L2}}{\theta_{K2}}\lambda_{L1}\frac{\sigma_{L1}}{\theta_{K1}}(\Pi-\Phi)\Pi^* + \left(\lambda_{L1}\frac{\sigma_1}{\theta_{K1}} + \frac{1}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}} \right)\frac{\theta_{L2}}{\theta_{K2}}\lambda_{L1}\Delta^*\frac{K_1^*}{K_1^w}m_{K1} \right]\hat{P}_1 \right\}, \tag{11}$$

$$\hat{w}_2 = \frac{1}{\Delta(\Pi-\Phi)\Pi^*} \times \left\{ \left[\lambda_{L1}\frac{\sigma_1}{\theta_{K1}}(\Pi-\Phi)\Pi^* + \left(\lambda_{L1}\frac{\sigma_1}{\theta_{K1}} + \frac{1}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}} \right)\lambda_{L1}\Delta^*\frac{K_1^*}{K_1^w}m_{K1} \right]\hat{P}_1 + \left[\lambda_{L2}\frac{\sigma_2}{\theta_{K2}}(\Pi-\Phi)\Pi^* - \lambda_{L1}\frac{\theta_{L1}}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}}\Delta^*\frac{K_1^*}{K_1^w}m_{K1} \right]\hat{P}_2 \right\}, \tag{12}$$

where

$$\Pi = \Delta + \lambda_{L1}\frac{\theta_{L1}}{\theta_{K1}}\frac{K_1^*}{K_1}m_{K1} > 0,$$

$$\Phi = \lambda_{L1}\frac{\theta_{L1}}{\theta_{K1}}\lambda_{L1}^*\frac{\theta_{L1}^*}{\theta_{K1}^*}\frac{K_1K_1^*}{(K_1^W)^2\Pi^*}(m_{K1})^2 \geq 0, \quad \text{and} \quad \Pi-\Phi>0.$$

Equations (10) to (12) collapse into the standard Jones solutions when $m_{K1}=0$, with the familiar implications. Specifically, if P_1 rises (as a result, say, of a new tariff on imports of commodity 1), the return for owners of specific capital in industry 1 rises more than proportionally, while returns on capital in industry 2 fall ($\hat{r}_1 > \hat{P}_1 > 0 > \hat{r}_2$); the wage rate for labor rises, but at a slower rate than P_1, so the real effect for workers is ambiguous ($\hat{P}_1 > \hat{w} > 0$).

What is the effect of allowing for international capital mobility? Again, imagine a home-country tariff that raises P_1, all else constant. Predictably, the benefits of the tariff for owners of K_1 are diminished at higher levels of m_{K1} as more foreign capital will enter the home economy in response to the change in relative prices. Indeed, at levels of m_{K1} exceeding some critical level, the increase in r_1 will fail to match the rise in P_1 ($\hat{r}_1 < \hat{P}_1$), and a real

gain for owners of K_1 is no longer assured (see the Appendix for the derivation of key results).

How are owners of specific capital in industry 2 affected? The losses for owners of K_2 from the new tariff on commodity 1 are increasing in the degree to which K_1 is internationally mobile (i.e. $\partial^2 r_2/\partial P_1 \partial m_{K1} < 0$). The logic is straightforward: the effect of inflows of K_1 into the home economy is to draw even more labor away from industry 2, rendering K_2 even less productive and driving down real returns more sharply. When it comes to trade policy, the stakes for owners of K_2 are thus actually greater when K_1 is more internationally mobile.

Finally, although of less direct interest to us here, consider what happens to the real wage effects of the price change when international capital mobility is introduced in the model. The tariff-induced rise in P_1 generates a larger increase in nominal wages at higher levels of m_{K1}, as inflows of K_1 increase demand for the fixed supply of labor. The real wage effects of the tariff remain ambiguous, however, since $\hat{P}_1 > \hat{w} > 0$ still holds. But for some set of consumption tastes, not biased too strongly in the direction of commodity 1, labor will enjoy real wage gains, and labor's incentive to support the tariff can only rise as K_1 becomes more internationally mobile. This possibility was first noted by Caves (1971, p. 19), and cited as a possible explanation for why labor in countries like Canada and Australia strongly supported tariffs for capital-intensive industries.

Of course, we can derive complementary results for the case of a new tariff on imports of commodity 2. The real losses to owners of K_1 from an increase in P_2 are smaller at higher levels of m_{K1}, since they are more readily offset by outflows of K_1 from the economy; the real gains for owners of K_2 are greater at higher levels of m_{K1}, since more labor is released from industry 1 for employment in industry 2; and the real wage effects for workers are ambiguous and depend in part on consumption tastes (here the nominal increase in w is smaller at higher levels of m_{K1}, since the capital outflows reduce aggregate demand for labor). The latter result is the flip side of the case above, isolated by Caves: if capital specific to the export sector is actually more mobile internationally than capital in the import-competing sector, tariffs will be *less* attractive to labor – a possibility discussed by Amano (1977, p. 142). Asymmetries in the extent to which different types of specific capital are mobile internationally clearly become critical. Treating international capital mobility as a generic phenomenon may thus be doing violence to a much more complicated and interesting set of relationships.

The basic insight that emerges from this general-equilibrium model then, one that has been overlooked in the existing literature on trade politics and capital mobility, is that as *some* specific factors become more internationally mobile, the stakes in trade politics can rise for owners of *other* specific factors. It is a relatively simple matter to develop more general models along these same lines, relaxing some of the assumptions employed above to allow,

say, that owners of all different types of capital (and labor) can be mobile internationally and intersectorally to varying degrees.[9] The same basic result emerges: an increase in the international mobility of capital in one industry, all else constant, while implying lower stakes in trade policy for owners in that industry, implies higher stakes in trade policy for owners in *other* industries – predictably, the latter effect is a positive function of how specific capital is to industry and location in these other industries (that is, how "trapped" the owners are in their positions along both dimensions). When the globalization of production is treated as a sector-specific rather than a generic phenomenon, what matters is not just how mobile one type of capital is, but how mobile it is compared with other types of capital.

If in fact there are substantial asymmetries in the extent to which capital in different sectors has become internationally mobile, the distributional effects outlined above should have an observable impact on the actual lobbying behavior of firms. In general, firm lobbying should be an increasing function of the distributional stakes involved in government decisions; that is, in the terms of the model, the degree to which firm profits respond to policy-induced changes in relative prices. In the benchmark model of lobbying and trade policy developed by Grossman and Helpman (1994), each organized industry group simply presents the government with a "contribution schedule" which maps how much it is willing to give to the government in financial contributions as a function of group welfare (which itself is just a positive function of the policy-determined domestic price of the industry's good). While I do not attempt to develop a full model of the policy-making process here, it seems reasonable to proceed in a similar fashion and imagine that policy-makers respond to lobbying pressure when setting tariffs and other regulations, and that firms are organized politically in each industry and spend on lobbying up to the point at which the expected marginal benefit equals marginal cost.[10] As the analysis above suggests, the marginal benefit from altering government policy in any industry should be *decreasing* in the international mobility of capital in that industry and *increasing* in the mobility of capital in other industries.

As a simple example of the logic here, imagine the scenario in which a textile firm operates in the same domestic locale (perhaps call it "Alabama") as several foreign and locally-owned automobile manufacturers who operate plants in multiple countries. We can expect that the textile firm will feel much less compelled to try to influence local tariff and tax policies if it also maintains factories abroad to which it can shift production at low cost, but

[9]See Hiscox (1998) for extensions. These extensions are also available as a supplement to this paper and can be downloaded at: http://www.people.fas.harvard/edu/~hiscox/EPsupplement.html

[10]For the moment, other considerations that policy-makers may entertain when setting policies that affect particular industries, including broader welfare effects, are set aside. This issue is taken up at the end of section 4 below.

assume for simplicity that the firm only owns the one domestic plant and would actually find it very costly to set up new facilities overseas. It is easy to see that a new tariff for the auto industry that leads to an expansion in auto production will raise the local price of labor and other intersectorally flexible inputs; moreover, this effect will be exacerbated to the extent that automakers are able to increase their investments in local production facilities in response to the new tariff. In this scenario, the more multinational the automakers (i.e. the easier it is for auto firms to shift production between different political jurisdictions), the greater incentives for the textile firm to lobby against the new policy, or to demand some offsetting tariff or tax break for itself. The empirical analysis reported in the following sections is a first attempt to test whether these types of relationships are evident, using the available data on international investment and lobbying activity in different US manufacturing industries.

3. INTERNATIONAL CAPITAL MOBILITY IN US MANUFACTURING INDUSTRIES

Testing these relationships empirically is a difficult challenge, and one that requires reasonable measures of the degree to which capital in each industry is mobile internationally and the amount of effort expended by firms in each industry lobbying for trade protection and other rent-generating policies. Since capital mobility is defined formally here as an elasticity, the ideal measure would gauge the degree to which international flows of capital in each sector respond to exogenous changes in relative rates of return at home and abroad. As an approximation, one might focus on unexplained international differences in rates of return in each sector, or how those rates of return respond to unanticipated changes in commodity prices.[11] Both types of measures would require a comprehensive, detailed set of data on rates of return and their predictors in each industry (for a large sample of the world's economies) that is, unfortunately, not yet available.

Here I focus instead on simpler indicators of international capital mobility for which data are readily available for US manufacturing industries. The most compelling of these are measures of the extent of inward and outward foreign direct investment occurring in each industry. The Bureau of Economic Analysis at the US Department of Commerce reports the total assets and sales of both foreign affiliates of US firms abroad (representing outward direct investment) and US affiliates of foreign firms (inward direct investment) on an annual basis and by two- and three-digit industry

[11]The first of these approaches is used in studies of regional and inter-industry labor and capital mobility which examine unexplained variance in wages and profits across regions or industries (e.g. Krueger and Summers, 1988; Rosenbloom, 1990; Hiscox, 2002) and in studies of financial market integration (e.g. Frankel, 1991); the second approach has been applied to gauge inter-industry capital mobility by Grossman and Levinsohn (1989).

classifications.[12] These are clearly imperfect measures of international capital mobility. They are actually indicators of capital *movement* rather than *mobility*. The approach is similar, in this sense, to gauging labor mobility by examining turnover rates for workers or levels of migration, and suffers from the same key limitation: there is no allowance made for variation in the incentives to move. Capital owners may find international movement relatively cheap, but have little incentive to actually move if return differentials between locations happen to be low for exogenous reasons. Nevertheless it seems reasonable to assume that quantities of foreign direct investment provide at least a rough guide to the degree to which firms in different industries have become "footloose" at the international level – and their capacity for re-allocating production across borders in response to changes in policy in one country or another.

The evidence, summarized in Table 1, strongly suggests that levels of international investment, and the extent to which they have changed in recent years, are highly variable across different industries. Table 1a reports the total value of assets of affiliates as a proportion of the total value of private assets in each two-digit industry in 1982 and 1996.[13] The first set of columns report the assets figures for foreign affiliates of US parent firms (outward direct investment). In some industries (e.g. petroleum products, chemicals, machinery, and transportation equipment), outward investment has increased markedly over time; but in other industries (e.g. textiles, and printing and publishing) such investment has remained quite low, and it has actually decreased in several cases (primary metal products, rubber and plastics, and lumber and wood products). The patterns in the data on inward direct investment look very similar as can be seen in the second set of columns in Table 1a, which report the assets figures for US affiliates of foreign parent firms. Inward investment has risen sharply in a number of industries (e.g. chemicals, and printing and publishing); but again in other industries rates of investment have been low and have changed very little over time (e.g.

[12]See US Department of Commerce, Bureau of Economic Analysis, *Foreign Direct Investment in the United States* (various years), and *Direct Investment Abroad* (various years). See Graham and Krugman (1994, pp. 179–190) for an extensive discussion of the strengths and weaknesses of these data. The periodic BEA "benchmark" surveys cover every US (or foreign) affiliate in which a foreign (or US) enterprise has direct or indirect ownership – the latter defined as control of 10 percent or more of voting securities. The annual surveys, from which I have extracted the data on assets and sales, cover a sample of those same affiliates, selected to include 90 percent of the universe in terms of value. The same surveys also report more detailed data on the investment positions of US and foreign parents with regard to their affiliates (including their equity in, and outstanding loans to, affiliates), which are needed to help calculate the US balance of payments. Net overall changes in these positions are recorded as "capital flows." While a case can be made for using these data rather than, or in addition to, the operating data on affiliates, they pose some daunting problems (investment positions are only recorded at "historical cost" or book value, for instance, not current market value), and I have not employed them here.

[13]The source for total industry assets is the BEA's *National Economic Accounts* (Table 3.1ES: Current-Cost Net Stock of Private Fixed Assets by Industry, 1947–2002) (http://www.bea.gov/bea/dn/FA2004/).

TABLE 1A INTERNATIONAL CAPITAL MOBILITY BY INDUSTRY: ASSETS

	Outward direct investment Foreign affiliates of US firms: ratio of assets to total US assets			*Inward direct investment* US affiliates of foreign firms: ratio of assets to total US assets			*Total direct investment* All affiliates: ratio of assets to total US assets		
Industry	1982	1996	Change	1982	1996	Change	1982	1996	Change
Food and kindred products	0.35	1.04	0.69	0.15	0.39	0.23	0.50	1.43	0.92
Textile mill products	0.05	0.07	0.01	0.03	0.17	0.14	0.08	0.24	0.16
Apparel	0.22	0.31	0.10	0.10	0.17	0.08	0.31	0.49	0.17
Lumber and wood products	0.08	0.06	−0.01	0.01	0.18	0.17	0.09	0.24	0.15
Furniture and fixtures	0.06	0.63	0.57	0.03	0.08	0.05	0.09	0.71	0.62
Paper	0.17	0.57	0.40	0.14	0.19	0.05	0.31	0.75	0.44
Printing and publishing	0.11	0.19	0.08	0.10	0.63	0.53	0.22	0.82	0.60
Chemicals	0.75	1.61	0.86	0.47	0.90	0.43	1.22	2.51	1.30
Petroleum and coal	3.21	3.53	0.31	0.69	0.76	0.07	3.90	4.29	0.38
Rubber and plastics	0.27	0.20	−0.07	0.06	0.22	0.16	0.34	0.42	0.08
Leather	0.09	0.21	0.12	0.25	0.03	−0.22	0.34	0.24	−0.10
Stone, clay, and glass products	0.25	0.38	0.14	0.16	0.61	0.45	0.41	0.99	0.58
Primary metals	0.25	0.20	−0.05	0.10	0.25	0.15	0.35	0.44	0.10
Fabricated metals	0.36	0.43	0.06	0.05	0.35	0.30	0.42	0.78	0.36
Industrial machinery	0.73	1.82	1.09	0.17	0.30	0.13	0.90	2.12	1.22
Electrical machinery	0.56	1.31	0.75	0.21	0.43	0.22	0.78	1.74	0.97
Transportation equipment	0.97	1.86	0.89	0.09	0.25	0.16	1.06	2.11	1.05
Instruments	0.67	1.18	0.51	0.06	0.32	0.26	0.73	1.50	0.77
Total manufacturing	0.67	1.17	0.50	0.20	0.43	0.22	0.87	1.60	0.72

Sources: BEA, *Foreign Direct Investment in the United States*, *Direct Investment Abroad*, and *National Economic Accounts*.

apparel, and furniture and fixtures) or have even fallen slightly (leather and leather products). The pattern across industries is quite similar for outward and inward investment: the average cross-industry correlation between the two measures in each year from 1982 to 1996 is 0.63. Summing assets of both types of affiliates for each industry yields a crude measure of aggregate investment (the final set of columns). In aggregate there has been an impressive expansion in total outward and inward investment in US manufacturing – total assets of foreign affiliates of American firms rose from $560 billion to $1.7 trillion between 1982 and 1996 (or from 67 to 117 percent of total private assets in US manufacturing), while assets of US affiliates of foreign firms rose from $169 billion to $633 billion (from 20 to 43 percent of total assets) – but this general change conceals some stark differences between industries.

TABLE 1B INTERNATIONAL CAPITAL MOBILITY BY INDUSTRY: SALES

	Outward direct investment Foreign affiliates of US firms: ratio of sales to total US sales			*Inward direct investment* US affiliates of foreign firms: ratio of sales to total US sales			*Total direct investment* All affiliates: ratio of sales to total US sales		
Industry	1982	1996	Change	1982	1996	Change	1982	1996	Change
Food and kindred products	0.14	0.34	0.20	0.06	0.15	0.09	0.20	0.49	0.30
Textile mill products	0.04	0.05	0.01	0.02	0.09	0.06	0.07	0.14	0.07
Apparel	0.04	0.10	0.06	0.02	0.05	0.03	0.06	0.15	0.09
Lumber and wood products	0.03	0.03	0.00	0.01	0.02	0.02	0.03	0.05	0.02
Furniture and fixtures	0.03	0.15	0.13	0.01	0.05	0.03	0.04	0.20	0.16
Paper	0.22	0.31	0.10	0.12	0.16	0.04	0.34	0.48	0.14
Printing and publishing	0.02	0.04	0.02	0.04	0.12	0.08	0.07	0.16	0.10
Chemicals	0.39	0.54	0.15	0.32	0.38	0.06	0.71	0.92	0.21
Petroleum and coal	0.68	0.70	0.03	0.19	0.43	0.24	0.87	1.13	0.27
Rubber and plastics	0.40	0.49	0.09	0.13	0.79	0.65	0.53	1.28	0.75
Leather	0.02	0.07	0.05	0.04	0.01	−0.03	0.06	0.09	0.02
Stone, clay, and glass products	0.15	0.16	0.01	0.11	0.31	0.20	0.26	0.48	0.21
Primary metals	0.08	0.07	−0.01	0.11	0.22	0.12	0.19	0.29	0.11
Fabricated metals	0.10	0.15	0.05	0.03	0.14	0.12	0.13	0.29	0.17
Industrial machinery	0.21	0.45	0.24	0.07	0.16	0.09	0.27	0.60	0.33
Electrical machinery	0.18	0.32	0.14	0.09	0.23	0.14	0.27	0.55	0.28
Transportation equipment	0.40	0.50	0.10	0.05	0.13	0.08	0.45	0.62	0.18
Instruments	0.23	0.26	0.03	0.04	0.11	0.07	0.27	0.37	0.10
Total manufacturing	0.25	0.34	0.09	0.10	0.20	0.10	0.35	0.53	0.18

Sources: BEA, *Foreign Direct Investment in the United States*, *Direct Investment Abroad*, and *National Economic Accounts*.

Table 1b reports the total value of sales of affiliates as a proportion of the total value of all shipments in each industry. Again, the first set of columns report the figures for foreign affiliates of US parent firms. By this measure too, it seems clear that outward investment has increased dramatically in some industries (e.g. chemicals, industrial machinery, and food and kindred products) while remaining low elsewhere (e.g. textile mill products, lumber and wood products, and printing and publishing). The same is clear from the data on sales of US affiliates of foreign firms: inward investment has grown sharply in some cases (e.g. rubber and plastics, and petroleum and coal), but has remained low in others (e.g. leather and leather products, apparel, and furniture and fixtures). The average annual correlation between these measures of outward and inward investment between 1982 and 1996 is 0.61. Again, the final set of columns just sums the sales figures for both types of

affiliates for each industry, revealing a sizeable increase in "footloose" production overall, but a shift that has been relatively small in many industries.

This measure of the output share of affiliates in each US industry has been employed in work by Graham and Krugman (1994, p. 43), and has significant advantages over the assets-based measure. While the values of US assets under the control of foreign firms, and foreign assets under the control of US firms, are perhaps closer conceptually to the issue of capital flows, the data do not allow for distinctions in the types of assets owned by each enterprise. The firms are themselves categorized by industry in the BEA surveys, but the assets they own may include a large variety of non-industry-specific investments (including equity holdings in other types of businesses, government securities, property holdings, and so on). Since the crux of the theoretical issue here is how the relocation of *production* across borders affects the size of policy-induced rents in each industry, focusing more closely on affiliate output data seems most appropriate. There is not a huge difference, it should be pointed out, between the basic patterns evident in the assets data and in the sales data. The average annual cross-industry correlation between the measures of assets of all affiliates and sales of all affiliates between 1982 and 1996 is 0.65.[14] Most importantly, both measures, as discussed above, suggest a substantial variation in international mobility across industries.

There are a variety of possible explanations for such differences in the extent of foreign direct investment across sectors. A range of industry and market characteristics will affect the *incentives* for engaging in multinational production – dependence upon inputs that are available at lower cost abroad, for instance, along with difficulties in contracting with foreign partners, the importance of intangible assets, economies of scale in marketing and distribution, and so on (see Caves, 1971, 1982).[15] But more important, given how we will be interpreting the data here, a large set of variables can affect the *ability* of firms to shift capital across national borders in particular industries. Differences in legal restrictions on foreign ownership across sectors, for instance, seem especially important in this regard. Governments typically restrict foreign ownership in sectors such as petroleum, transportation equipment, and energy, transportation, and communications services, in which concerns about national security are salient.[16] Information asymmetries may also pose important barriers to investment in some industries. Gordon and Bovenberg (1996) have persuasively argued that asymmetries in

[14]The correlation is much stronger (0.85) between the assets and sales of foreign affiliates of US firms (outward investment), than the corresponding correlation (0.45) for the figures on US affiliates of foreign firms (inward investment), suggesting that foreign firms operating in the United States may tend to invest in a more diversified range of assets than US firms operating abroad and/or that they tend to use production processes that depart more from local producers in terms of capital intensity than do US producers abroad.

[15]For empirical analysis of variance in investment rates across industries, see Grubaugh (1987) and Martin (1991).

[16]For a discussion, see Spencer (1988, pp. 19–27) and Spero and Hart (1997, pp. 127–340).

information held by investors in different economies play a large role in inhibiting international capital mobility. These asymmetries may be particularly acute in industries in which profitability is strongly affected by local economic and political variables, such as consumer tastes, input costs, or regulations.

4. INDUSTRY LOBBYING AND INTERNATIONAL CAPITAL MOBILITY: SOME PRELIMINARY TESTS

Measuring lobbying efforts by firms, whether in politics generally or on trade issues specifically, poses another serious empirical challenge. Firms can attempt to influence policy in an unnerving variety of ways. They can buy advertisements in the media, for instance, in hopes of drumming up public and political support, testify formally before legislative committees deliberating on policy issues, attempt to persuade individual policy-makers (publicly or privately) to help them, and endorse and contribute financially to political candidates and parties that support their cause. Much lobbying is undoubtedly conducted out of public view and is extremely difficult to track. The most direct, tangible indicator of industry lobbying in US politics is the total value of financial contributions made by firms to the political campaigns of members of Congress. A growing body of research has made use of this data to investigate lobbying patterns and to explain congressional behavior and votes on a range of issues (including trade policy).[17] The Federal Election Commission reports data on all campaign contributions made by political action committees (PACs) to individual political candidates in each election cycle. Coding individual corporate PACs according to the standard industry classifications is an enormous task, however, and previous research that has examined the relationship between corporate contributions and the characteristics of different industries has been based on data from relatively small samples of firms (e.g. Pittman, 1977; Boies, 1989).[18] Fortunately, McKeown and Fordham (2001) have recently completed coding all corporate PAC campaign contributions between 1981 and 1990 using two-digit SIC categories, and it is this dataset I have relied upon primarily here.[19] Specifically, I examine the sum of campaign contributions made to all political candidates in each two-year election cycle from PACs created by firms in each two-digit industry.

[17]See Gopoian (1984), Poole and Romer (1985), Langbein (1986), Evans (1988), Grenzke (1989), Wright (1989, 1990), Hall and Wayman (1990), Snyder (1990), Stratmann (1991, 1992), Grier et al. (1994), Romer and Snyder (1994), and Hansen and Mitchell (2000). On trade policy specifically, Baldwin and Magee (2000) have investigated the relationship between contributions to individual members of Congress from business groups and labor unions and legislative votes on NAFTA, the last GATT agreement, and fast-track authorization.

[18]Grier et al. (1994), which merged data on firms listed in the Standard & Poor's COMPUSTAT database on publicly traded companies with data on PAC contributions for the 1978–1986 elections, appears to be an exception – although this set still only accounted for 50–60 percent of corporate PACs according to the authors.

[19]I am very grateful to McKeown and Fordham for making the data available to me.

Campaign contributions may not be aimed only (or even chiefly) at encouraging politicians to alter trade restrictions, but the model discussed above is not restricted to trade policy issues either; it describes relationships between international mobility and the income effects of *any* kind of policy change that alters relative prices. For a general test of the model's implications then, campaign contributions should provide decent raw material. As an additional test, I have examined data on lobbying that is targeted more narrowly towards the trade issue: specifically, the annual number of complaints filed by firms with the US International Trade Commission requesting anti-dumping or countervailing duties. As Gilligan (1997) has noted, these complaints furnish perhaps the most direct measure available of private demand for alterations in US trade policy. The petitions have become the standard first step for industries seeking protection (see Horlick and Oliver, 1989).[20] A growing number of studies have now used the ITC data to investigate different theories about the demand for protection either in the aggregate (e.g. Takacs, 1981; Feigenbaum and Willett, 1985; Coughlin et al., 1989; Feinberg, 1989; Knetter and Prusa, 2000) or across different industries (e.g. Blonigen and Feenstra, 1996; Gilligan, 1997). The dependent variable for this part of the analysis is the annual number of petitions filed by each industry (available at both two- and three-digit SIC levels for the period 1982–1996).[21]

The approach taken here involves relating lobbying activity among industries, measured by campaign contributions or ITC petitions, to the measures of international capital mobility. As in most related studies, the analysis is limited to manufacturing industries, for which reliable data on the key variables are available. The crucial explanatory variables are the measures of the international mobility of capital in each industry and in all other industries. As a measure of *own-industry* capital mobility I have simply used the total amount of both outward and inward direct investment in each industry defined as the sales of all affiliates as a proportion of total industry shipments (see Table 1b above). Since mobility is defined as an elasticity, and by itself has no implications for the *direction* of investment flows, no distinction is made here between outward and inward movements of capital. We can expect, both from the model outlined in section 2 and the conventional wisdom, that this basic measure of the international mobility of capital in each industry will be *negatively* related to industry-lobbying efforts. The measure of *other-industry* capital mobility is a little more novel. For each industry I calculated the output-weighted average mobility of capital in all *other* manufacturing industries: that is, total sales of all affiliates in all other industries as a proportion of total shipments in all other industries.

[20]Even for firms aiming to influence trade policy-making in Congress or the White House, filing these petitions serves a necessary political function by demonstrating that they have exhausted all "ordinary" avenues for redressing their grievances before they have addressed demands directly to lawmakers.

[21]I am very grateful to Kerry Chase for sharing the data on ITC petitions.

According to the model, this measure should be *positively* associated with industry lobbying since, all else constant, firms in each industry should have a greater incentive to lobby for a policy change when owners of capital in *other* industries are more footloose.

The analysis also incorporates a range of variables that have been shown to have significant effects on the lobbying propensities of different industries (and firms) in previous empirical studies (see Pittman, 1977; Grier et al., 1994; Hansen and Mitchell, 2000). The size of the industry, measured as the total value of shipments, is included as an obvious constraint on total industry contributions (and also because larger industries may expect to meet with more political success and are thus more likely to be active in politics). To account for trade-related pressures specifically, the estimations include controls for the value of imports in each industry and for export sales.[22] Imports should be positively associated with lobbying in general, and lobbying on trade matters specifically, since import restrictions and related regulations that favor home-country firms will be more attractive to domestic producers when competition from imports is more intense; exports are likely to be negatively associated with lobbying, on the other hand, since exporters are relatively more concerned with world rather than local markets and face the risk of retaliation abroad for discriminatory, rent-generating policies at home. The total value of industry sales to the federal government is included as an indicator of the sensitivity of industry prices to political decisions. Dependence on government sales has been shown to be positively and significantly related to campaign contributions in previous studies.[23] Finally, the degree of industry concentration is also included as a control variable – measured by the four-firm concentration ratio.[24] The expectation, which now has considerable empirical support, is that more concentrated industries are better able to overcome collective action problems and coordinate their lobbying efforts, and are thus more active politically. All estimations include dummy variables for each period/year to account for episodic and trend effects in contributions and petitioning, and the principal models are also estimated separately with full industry fixed effects.

Table 2 provides descriptions and summary statistics for all the main variables used in the analysis. The panel of two-digit industries examined is the set of 18, shown in Table 1 above, for which the BEA provides survey data on direct investment abroad and at home. Observations for each of these industries are pooled across the five two-year election periods (from 1981–1982 to 1989–1990) for which McKeown and Fordham have compiled industry contributions data. The data on investment across three-digit

[22]Data on imports, exports, and total shipments by industry are from Feenstra (1997).

[23]The data are reported by the US Department of Commerce, Bureau of the Census, *Census of Manufactures: Manufacturers' Shipments to Federal Government Agencies* (various years).

[24]The data are from the US Department of Commerce, Bureau of the Census, *Census of Manufactures: Concentration Ratios* (various years).

TABLE 2 DESCRIPTIVE STATISTICS

	(a) Two-digit industries; election periods, 1981–1990					(b) Three-digit industries; years, 1982–1996				
Variable	Obs.	Mean	Std. dev.	Min.	Max.	Obs.	Mean	Std. dev.	Min.	Max.
Contributions (1995 $)	90	790,919	979,163	0	5,096,399					
Petitions	90	5.43	12.79	0	83	1,270	0.44	3.29	0	84
Own-Industry Mobility (affiliate/total sales)	90	0.31	0.26	0.03	1.12	1,270	0.33	0.73	0	6.60
Other-Industry Mobility (affiliate/total sales)	90	0.38	0.05	0.28	0.50	1,270	0.43	0.07	0.30	0.55
Shipments (1995 $bn)	90	86.89	69.61	5.84	330.03	1,270	1,768.32	2,800.58	10.13	33,880.31
Imports (1995 $bn)	90	11.58	14.17	0.48	75.14	1,270	283.22	841.73	0.06	11,306.58
Exports (1995 $bn)	90	7.85	10.91	0.27	52.28	1,270	196.34	469.47	0.25	5,366.63
Government Sales (1995 $bn)	90	6.29	14.48	0.00	61.72	1,270	51.77	219.17	0.00	1,887.00
Concentration (four-firm ratio)	90	37.57	8.71	19.83	56.68	1,270	38.78	16.06	7.00	93.80

industries available from the BEA surveys is less complete, since figures are frequently suppressed in particular categories and years to ensure confidentiality for survey respondents. Compiling the available data from the surveys allows for the inclusion of a total of 101 industries for which the capital mobility measures can be calculated for multiple years and pooled with the annual petitions scores over the period from 1982 to 1996.[25]

Table 3 reports the results from the analysis of corporate campaign contributions at the two-digit level. The first estimation equation (1) simply includes the measure of own-industry capital mobility along with the control variables. While own-industry capital mobility does appear to have a negative effect on lobbying efforts, this effect is minuscule;[26] moreover, the effect disappears once we allow that industry lobbying is also influenced by variance in capital mobility in other industries, as is clear from the results for equation (2). Other-industry capital mobility has a large positive effect on industry contributions. An increase of one standard deviation (0.05) in the proportion of affiliate sales in total output in *other* industries raises industry contributions by over $800,000 (the sample mean value of contributions is only $790,919). The same results are evident from equation (3), which re-estimates the model with each of the explanatory variables lagged by one period to allow more time for structural changes to have political effects. Equation (4) re-estimates the model with industry fixed effects. Applying full fixed effects here is particularly demanding since we can observe the 18 industries over only five election periods, and the standard errors for the parameter estimates increase markedly with the addition of another 17 variables. Other-industry capital mobility (and industry exports) appear not to have significant effects on campaign contributions in this final specification, although the sharp increase in standard errors is chiefly responsible; introducing industry fixed effects does also reduce the size of the estimated effect of other-industry mobility, but it remains sizeable.[27]

[25]A full list of all the industries represented in the dataset is available in a supplement to this paper (http://www.people.fas.harvard.edu/~hiscox/EPsupplement.html). Where the annual BEA surveys excluded industry categories altogether it was because investment totals were negligible (as is clear from cross-referencing to the more complete *Benchmark* surveys), so values for these industry-years were recorded as zero, but no other values were imputed.

[26]By this estimate, an increase of one standard deviation (0.26) in the proportion of affiliate sales in total industry output would lead to a $122,000 decrease in contributions.

[27]Note that cross-sectional data are far less helpful than time-series data for testing the main propositions here. A negative correlation between the measures of own- and other-industry mobility is assured by definition for each cross-section of industries: removing a high-mobility industry from the all-industry weighted average will obviously reduce the latter, and vice versa. The correlation is very imperfect, of course, even in a single cross-section of industries since industries differ in size (output weights) not just in mobility levels, and pooling across time reduces the correlation: the correlations between the two measures are only −0.08 and −0.07, respectively, in the two- and three-digit datasets. But including measures of the industry's own capital mobility and the mobility of capital in all other industries' in the same estimation has the effect of raising the standard errors for the associated coefficients and makes the statistical tests more demanding than they might otherwise be.

TABLE 3 INTERNATIONAL CAPITAL MOBILITY AND INDUSTRY CAMPAIGN CONTRIBUTIONS, 1981–1990

Dependent variable: industry contributions to Congressional campaigns[a]

	(1)	(2)	(3)	(4)
Own-Industry Mobility[b]	−0.473**	0.423		−0.154
(affiliate/total sales)	[0.224]	[0.339]		[0.530]
Other-Industry Mobility[b]		16.352***		4.980
(affiliate/total sales)		[4.839]		[8.310]
Shipments (1995 $bn)	6,527.953***	6,395.587***		7,133.316***
	[1,397.337]	[1,313.978]		[1,990.736]
Imports (1995 $bn)	28,180.967***	30,096.719***		20,766.702**
	[8,893.373]	[8,378.316]		[9,874.437]
Exports (1995 $bn)	−23,147.168**	−22,142.424**		−15,437.656
	[11,212.512]	[10,543.129]		[14,125.971]
Government Sales	20,310.856***	18,925.588***		335,929.434***
(1995 $bn)	[5,177.560]	[4,883.758]		[79,042.307]
Concentration	9.6	7.172		−16.22
(four-firm ratio)	[7.804]	[7.370]		[16.434]
Lagged Own-Industry Mobility[b] (affiliate/total sales)			0.476 [0.454]	
Lagged Other-Industry Mobility[b] (affiliate/total sales)			18.815*** [5.818]	
Lagged Shipments (1995 $bn)			8,112.435*** [1,658.453]	
Lagged Imports (1995 $bn)			32,177.116*** [10,381.535]	
Lagged Exports (1995 $bn)			−33,057.733** [13,263.383]	
Lagged Government Sales (1995 $bn)			24,588.669*** [5,617.270]	
Lagged Concentration (four-firm ratio)			12.406 [8.565]	
Observations	90	90	72	90
Adjusted R^2	0.75	0.78	0.81	0.94

Notes: Standard errors in brackets. *Significant at 10%; **significant at 5%; ***significant at 1%.

[a]All estimations include constant and period dummies. Model (4) includes full fixed effects.

[b]Coefficients shown in millions.

As for the estimated effects of other variables, all are in the directions expected. Industry size (measured by total shipments) has a significant positive effect on campaign contributions, as does the value of industry sales to government agencies: an increase in total industry shipments of $70 billion (the sample's standard deviation) raises contributions by over $540,000; a proportionate increase in government sales (of $10 billion) generates an

extra $180,000 in contributions. More concentrated industries appear to contribute more to political campaigns, as expected, although the effect is not statistically significant. Interestingly, import competition has a significant positive effect on contributions, while export sales have a significant negative effect, indicating that trade-related pressures may exercise a strong influence on general lobbying patterns. A $10 billion rise in total industry imports lifts contributions by about $300,000; a similar rise in industry exports reduces contributions by about $250,000, all else constant.

Table 4 reports the results from the corresponding analysis of ITC petitions that employs the same data on two-digit industries. Since the dependent variable is a count of the number of petitions filed in industry *i* in period *t*, a discrete probability model is required here to obtain maximum likelihood estimates. And since the filing of a petition in industry *i* in period *t* may well influence the probability of another petition being filed in that industry that year (perhaps because firms and industry associations try to coordinate joint filings), it is more appropriate to use a negative binomial model rather than the simpler Poisson distribution which assumes independence between events (see King, 1989, pp. 126–129).

The first specification (1) again includes just the measure of own-industry capital mobility (along with the controls) in the estimation of petition filings, while model (2) adds the measure of capital mobility in other industries. Again, contrary to expectations, own-industry mobility does not appear to have a negative impact on industry lobbying; other-industry capital mobility, however, has a large positive effect on lobbying efforts. An increase of one standard deviation in the proportion of affiliate sales in total output in *other* industries generates an additional 70.4 petitions (the sample mean number of petitions was 5.4).[28] Again these effects do not change appreciably when the model is estimated allowing for a one-period lag [equation (3)]. Including full industry fixed effects again raises the standard errors of all the estimates, but only slightly reduces the estimated magnitude of the effect of other-industry mobility on industry lobbying efforts.

Petitions are unlike campaign contributions in that, while all firms can presumably expect that they will be able to benefit by persuading politicians to alter some aspect of public policy, only firms in industries facing significant competition from foreign producers stand to benefit from positive rulings by the ITC imposing additional duties on particular categories of imports. We thus can expect that the effects of international capital mobility on petition filing should be more pronounced among these import-competing industries. Equations (5) through (7) re-estimate the three principal models for just those industries with a negative trade balance in any given year. The results are quite impressive. The estimated positive effect of

[28]First differences for the number of petitions filed are calculated using the "Clarify" software developed by King et al. (2001).

TABLE 4 INTERNATIONAL CAPITAL MOBILITY AND INDUSTRY ITC PETITIONS, 1981–1990
Dependent variable: number of petitions filed with the ITC by (two-digit) industries[a]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own-Industry Mobility	−0.816	4.184		5.28	9.522***		6.085
(affiliate/total sales)	[1.646]	[2.936]		[5.373]	[3.360]		[7.115]
Other-Industry Mobility		72.678**		49.603	432.024***		247.394*
(affiliate/total sales)		[35.191]		[65.849]	[129.785]		[142.322]
Shipments (1995 $bn)	−0.003	−0.003		−0.01	−0.045**		−0.031
	[0.008]	[0.008]		[0.012]	[0.018]		[0.020]
Imports (1995 $bn)	0.028	0.014		0.118**	0.095*		0.305**
	[0.038]	[0.038]		[0.053]	[0.053]		[0.140]
Exports (1995 $bn)	0.025	0.05		−0.130*	0.232*		−0.017
	[0.058]	[0.061]		[0.077]	[0.133]		[0.142]
Government Sales (1995 $bn)	−0.053**	−0.072***		0.655*	−0.060**		−0.973
	[0.023]	[0.023]		[0.356]	[0.026]		[1.141]
Concentration (four-firm ratio)	0.109**	0.111**		0.300**	0.116*		0.295
	[0.050]	[0.048]		[0.139]	[0.061]		[0.186]
Lagged Own-Industry Mobility			3.174			6.184*	
(affiliate/total sales)			[3.189]			[3.747]	
Lagged Other-Industry Mobility			62.641*			353.960***	
(affiliate/total sales)			[35.343]			[111.772]	

TABLE 4 *Continued*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged Shipments (1995 $bn)			−0.005			−0.044**	
			[0.009]			[0.017]	
Lagged Imports (1995 $bn)			0.005			0.098**	
			[0.039]			[0.048]	
Lagged Exports (1995 $bn)			0.079			0.209*	
			[0.064]			[0.111]	
Lagged Government Sales			−0.061***			−0.037	
(1995 $bn)			[0.021]			[0.025]	
Lagged Concentration			0.108**			0.113**	
(four-firm ratio)			[0.046]			[0.056]	
Observations	90	90	72	90	72	60	72
Log likelihood	−202.24	−200.08	−173.91	−153.34	−141.19	−128.6	−111.63
Pseudo-R^2	0.04	0.05	0.05	0.27	0.1	0.1	0.29

Notes: Standard errors in brackets. *Significant at 10%; **significant at 5%; ***significant at 1%.
[a]All estimations include constant and period dummies. Models (4) and (7) include full fixed effects.

other-industry capital mobility increases more than threefold once the analysis is restricted to these import-competing industries, and it remains significant and very large even in the most restrictive model with full fixed effects.

As for the control variables, the estimated effects on petitions are generally consistent with expectations, although the results are not overwhelming. Industry size, for instance, does not appear to have a significant impact on ITC petitions. Industry imports and exports seem strongly associated with petition filings only in the model (4) allowing for industry fixed effects: here a one-standard-deviation increase in imports produces 2.5 new petitions in each period, while a similar rise in exports reduces the number of petitions by about 3.2. When the analysis is limited to just those industries with negative trade balances – models (5) through (7) – the motivating effects of increased import competition on petitioning are much clearer, while export levels do not appear to have robust effects. In general, more concentrated industries appear to file more petitions, a result that fits with standard assumptions about industry political activity.

The results from the analysis of petition filings thus generally support the findings from the study of campaign contributions, especially in terms of the key relationship between other-industry international capital mobility and lobbying efforts. The same types of models can be estimated using the yearly data on ITC petitions at the more detailed three-digit classification level. Table 5 reports the results from these estimations. The findings here are very similar to those obtained from the analysis at the two-digit level. In particular, they indicate little support for the common argument that, by itself, a rise in the international mobility of capital in each industry will lead to a decline in rent-seeking by firms. In fact, here *own*-industry mobility appears to have a quite robust *positive* effect on petitioning, and the estimated effect is noticeably larger among import-competing industries [models (5) through (7)].[29] Again there is very strong support for the argument that lobbying incentives rise for firms in an industry when capital that is specific to other types of production becomes more mobile internationally. From equation (2), a one-standard-deviation increase in the proportion of affiliate sales in total output in *other* industries generates an additional 15.3 petitions (the sample mean number of petitions was 0.4). The estimated effect is again smaller when full fixed effects are introduced, as the industry dummies account for a good deal of variation in filings and the number of years (15) is relatively small (the standard errors of the estimates again rise sharply). Other relationships hold up reasonably well here at the three-digit level too. Industry size appears to be a slightly better predictor of petitions than was apparent from the two-digit industry data, while concentration levels and sales to the federal government no longer appear to have any significant effects. Industry imports and exports

[29]A one-standard-deviation increase in own-industry mobility generates 0.1 extra petitions.

TABLE 5 INTERNATIONAL CAPITAL MOBILITY AND INDUSTRY ITC PETITIONS, 1982–1996
Dependent variable: number of petitions filed with the ITC by (three-digit) industries[a]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own-Industry Mobility	0.744***	1.715***		−0.267	4.247***		3.419*
(affiliate/total sales)	[0.216]	[0.552]		[0.392]	[0.972]		[1.927]
Other-Industry Mobility		115.285**		67.676	305.985***		146.874
(affiliate/total sales)		[57.145]		[102.080]	[55.180]		[127.094]
Shipments (1995 $bn)	0.00048***	0.00035**		−0.00008	0.00023		0.00017
	[0.00013]	[0.00014]		[0.00016]	[0.00019]		[0.00020]
Imports (1995 $bn)	0.00130**	0.00135**		0.00200**	0.00123		0.00155*
	[0.00063]	[0.00061]		[0.00084]	[0.00079]		[0.00092]
Exports (1995 $bn)	−0.00214***	−0.00154**		−0.00275**	−0.00119		−0.00258*
	[0.00070]	[0.00073]		[0.00131]	[0.00099]		[0.00149]
Government Sales (1995 $bn)	−0.00066	−0.00072		−0.00087	0.00229		0.00205
	[0.00100]	[0.00099]		[0.00238]	[0.00238]		[0.00287]
Concentration (four-firm ratio)	−0.015	−0.013		−0.031	−0.007		0.028
	[0.012]	[0.012]		[0.032]	[0.016]		[0.045]
Lagged Own-Industry Mobility			1.798***			3.501***	
(affiliate/total sales)			[0.614]			[1.058]	
Lagged Other-Industry Mobility			133.994**			296.596***	
(affiliate/total sales)			[65.021]			[58.252]	
Lagged Shipments (1995 $bn)			0.000004***			0.000005**	
			[0.00000]			[0.00000]	

TABLE 5 *Continued*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged Imports (1995 $bn)			0.000000			0.000000	
			[0.00000]			[0.00000]	
Lagged Exports (1995 $bn)			0.000000			0.000000	
			[0.00000]			[0.00000]	
Lagged Government Sales			0.000000			0.000000	
(1995 $bn)			[0.00000]			[0.00000]	
Lagged Concentration			−0.012			−0.003	
(four-firm ratio)			[0.012]			[0.016]	
Observations	1,270	1,270	1,184	1,270	832	784	832
Log likelihood	−615.8	−613.47	−571.23	−461.98	−385.49	−372.17	−280.97
Pseudo-R^2	0.08	0.09	0.08	0.31	0.12	0.12	0.36

Notes: Standard errors in brackets. *Significant at 10%; **significant at 5%; ***significant at 1%.
[a]All estimations include constant and period dummies. Models (4) and (7) include full fixed effects.

have robustly significant positive and negative effects on petitioning, respectively, which fit quite well with expectations.[30]

Overall, this admittedly rough analysis, which relies on very broad measures of international capital mobility and political activity at the industry level, provides some compelling results. The analysis at both the two- and three-digit levels of industry classification, and using the evidence on campaign contributions as well as petitioning, indicates that own-industry international mobility does not have robustly negative effects on lobbying by firms; on the other hand, other-industry mobility does have a large and positive effect on lobbying efforts. The former result is not anticipated by the model sketched out in section 2 above or by the prevailing wisdom about the generic effects of rising international mobility. One possible explanation for this result is that international capital mobility, as measured here, may actually be partly endogenous to industry lobbying. This might be so if lobbying efforts, by altering (or threatening to alter) policy and raising the local returns for owners of capital specific to an industry, thereby encourages larger inflows of foreign direct investment and so raises the capital mobility score for that industry – in line with expectations about tariff-jumping and "quid pro quo" investment by foreign firms. One problem with this interpretation is that the reverse might also be expected to occur: that is, an absence of effective lobbying for advantageous changes in policy would lead to larger outflows of direct investment by firms in an industry and so a higher mobility score. Estimating each of the models with the mobility measures lagged by one period/year (as above) provides a measure of confidence in the basic results. Moreover, straightforward tests for reverse causation between the mobility scores and the measures of industry lobbying, in either dynamic or simultaneous form, also come up negative.[31]

[30]From model (2) a $1 billion rise in total industry imports raises petitions by 1.4; a similar rise in industry exports reduces petitions by 0.4, all else constant.

[31]Granger tests for dynamic relationships between contributions and mobility (using the two-digit industry data), and between petitions and mobility (using both the two- and three-digit industry data), reject the hypothesis that lobbying (in either form) Granger-causes mobility. Similarly, Hausman tests reject the hypothesis that there is simultaneous causation between lobbying and mobility in either set of data. Using average plant size to instrument for capital mobility in the estimations also yields substantively identical results (I am grateful to an anonymous reviewer for suggesting this particular test). As an alternative check, I also generated separate measures of capital mobility for 13 two-digit industries using data available on total cross-border mergers and acquisitions from UNCTAD's annual *World Investment Report* (the value of such transactions is normalized as a proportion of total OECD output in each industry). These transactions are presumably much less likely than the US-specific measures to be endogenous to US-based industry lobbying. Substituting the new measures for the old measures of own-industry and other-industry capital mobility has no effect on the substantive results: own-industry mobility is not significantly (and mostly positively) associated with contributions and petitions, while other-industry mobility is strongly and positively associated with both types of lobbying efforts. Results from all these tests, and other robustness checks, are available in a supplement to this paper (http://www.people.fas.harvard.edu/~hiscox/EPsupplement.html).

It seems more likely that the absence of a negative relationship between own-industry capital mobility and lobbying efforts can be explained in a different way. In a fully elaborated model of the policy-making process, we might allow that governments attach significant weight not just to lobbying "contributions" from groups but to the welfare effects that policy decisions have for the broader economy. In terms of the general-equilibrium model developed in section 2 above, this focuses our attention on the impact of price shifts for the real incomes of workers. It was clear from the model that real wages were more likely to be improved by policies that raise prices in industries in which capital was more mobile internationally, ceteris paribus. From this perspective one can suggest that increased levels of international mobility in an industry may actually provide firms there with greater political leverage by making more potent their threat to "exit" if their demands are not met by policy-makers (see Hirschman, 1970). The marginal expected returns from lobbying may not fall drastically for owners of capital that become more mobile internationally if governments become more responsive to their requests.

5. CONCLUSIONS

The findings here suggest that we need to reconsider the rose-tinted conventional wisdom that increasing international capital mobility reduces firms' incentives to lobby for protectionist rents and inevitably leads to growing support for trade liberalization among business interests. The argument I make here is that whether greater international capital mobility lowers firms' incentives to lobby for rents in general, and rents generated by adjustments in trade policy in particular, depends critically upon levels of inter-industry capital mobility. The analysis suggests that if capital is highly industry-specific, greater international flows of some types of specific capital may increase lobbying by owners of other types of specific capital. Judging from an initial examination of the data on campaign contributions made by firms in different manufacturing industries, and petitions filed with the ITC for trade protection, these effects appear to be quite strong.

There are several ways in which this line of inquiry might be extended productively. In the traditional analysis treating international capital mobility as a generic phenomenon, and resting on the standard Heckscher–Ohlin framework, workers are generally expected to become increasingly protectionist as owners of capital become more mobile since import barriers should induce tariff-jumping foreign investments that would raise local demand for labor (e.g. Chase, 1998). But allowing for industry specificity among types of capital upsets this picture, as noted above in section 2, since real wages may fall if capital is actually more internationally mobile in (export) sectors than in those industries in which tariffs are put in place. The best "next step" here would probably be to incorporate these real wage

effects in a fully-elaborated model of tariff-setting along the lines set by Grossman and Helpman, but allowing for cross-industry variance in international capital mobility.

APPENDIX. MATHEMATICAL NOTES

The proofs for the results reported in section 2 are reasonably straightforward. First consider returns to owners of K_1. Given $\hat{P}_1 > 0$ and $\hat{P}_2 = 0$, then we can show that $\hat{r}_1 > 0$ and $\partial^2 r_1 / \partial P_1 \partial m_{K1} < 0$ since (after simplifying $\Pi - \Phi$) it is clear that m_{K1} only enters equation (10) in the denominator with positive sign. Manipulating equation (10), we can also show that for $\hat{r}_1 > \hat{P}_1$ to hold:

$$\lambda_{L1}\frac{\sigma_1}{\theta_{K1}} + \frac{1}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}} < \Delta + \lambda_{L1}\frac{\theta_{L1}}{\theta_{K1}}\frac{K_1^*}{K_1}m_{K1} - \lambda_{L1}\frac{\theta_{L1}}{\theta_{K1}}\lambda_{L1}^*\frac{\theta_{L1}^*}{\theta_{K1}^*}\frac{K_1 K_1^*}{(K_1^W)^2\Pi^*}(m_{K1})^2.$$

Solving the quadratic finds the (positive) level for m_{K1} at which owners of K_1 no longer receive unambiguous real gains.

Now consider returns to owners of K_2. Given $\hat{P}_1 > 0$ and $\hat{P}_2 = 0$, then it is clear from equation (11) that $\hat{r}_2 < 0$. The sign of the relevant cross-derivative, $\partial^2 r_2 / \partial P_1 \partial m_{K1}$, is determined by the sign of its numerator, which reduces to:

$$-\lambda_{L1}\frac{\theta_{L2}}{\theta_{K2}}\frac{K_1^*}{K_1^W}\left(\lambda_{L1}\frac{\sigma_1}{\theta_{K1}} + \frac{1}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}}\right)(\Delta\Delta^*)^2 < 0.$$

Finally, consider returns to owners of L. Given $\hat{P}_1 > 0$ and $\hat{P}_2 = 0$, then it is also clear from equation (12) that $\hat{w} > 0$. The sign of the relevant cross-derivative, $\partial^2 w / \partial P_1 \partial m_{K1}$, is again determined by the sign of its numerator, which reduces to:

$$\lambda_{L1}\frac{K_1^*}{K_1^W}\left(\lambda_{L1}\frac{\sigma_1}{\theta_{K1}} + \frac{1}{\theta_{K1}}\lambda_{L2}\frac{\sigma_2}{\theta_{K2}}\right)(\Delta\Delta^*)^2 > 0.$$

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