



Export Platforms

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We have studied horizontal FDI as a way to serve a single foreign market by owning an affiliate who produces in, and sells exclusively to, that market. The assumption that the affiliate only sells in its host market kept the model simple (you will see how messy things get shortly), allowing us to focus on the role of export costs, market size, and returns to scale in the firm’s export-vs.-multinational choice.

We now add another option to the firm’s choice set. A firm with an affiliate in country j can now sell country- j produced goods in other countries. When a firm operates an affiliate in a foreign country to serve other foreign countries, we call that investment *export platform FDI*.

1 The heterogeneous-firm model with export platforms

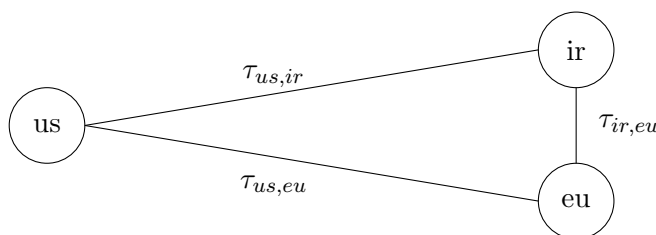
To extend the heterogenous-firm model we studied earlier to include export platforms, we need to add more countries and specify how costly it is to ship goods between all of the country pairs. To keep the analysis as simple as possible, we focus on a three country model. It is straightforward, but tedious to add more countries.

Naming the three countries i , j , and k is natural, but the abstraction may make it difficult to keep track of things. Instead, we will choose a famous export platform example: the United States (us), the European Union (eu), and Ireland (ir). US companies, as well as companies from other countries, often use Ireland as an export platform to serve EU countries. Our analysis will highlight the reasons why Ireland is an attractive destination for export platforms.

Trade costs. Let $\tau_{ij} \geq 0$ be the cost to export goods from country i to country j . We assume these costs are symmetric: If it costs $\tau_{ij} = 0.10$ to ship from i to j , then it costs $\tau_{ji} = 0.10$ to ship from j to i . In our example, we have $\tau_{us,eu} = \tau_{eu,us}$, $\tau_{us,ir} = \tau_{ir,us}$, and $\tau_{eu,ir} = \tau_{ir,eu}$.

Geography. Export platforms exist to take advantage of the placement of countries across the world. For our example, the world looks something like figure 1. We have drawn the United States as far from both Ireland and the EU, but Ireland and the EU are close to each other. This is the type of configuration that often generates export platform FDI.

Figure 1: The geography of the model



To capture the idea that the United States is far from, and expensive to ship to, the EU and Ireland, we assume the $\tau_{us,eu}$ and $\tau_{us,ir}$ are relatively large, and that $\tau_{ir,eu}$ is relatively small.

Ways to serve a foreign market. How can a US firm serve the European Union and Ireland? There are six possibilities,

1. $[x, x]$ Export to eu from us , export to ir from us
2. $[m, x]$ Multinational affiliate in eu , export to ir from us
3. $[x, m]$ Export to eu from us , multinational affiliate in ir
4. $[m, m]$ Multinational affiliate in eu , multinational affiliate in ir
5. $[m, xp]$ Multinational affiliate in eu , export to ir from eu
6. $[xp, m]$ Export to eu from ir , multinational affiliate in ir

For each possibility, the notation $[a, b]$ keeps track of how the US firm serves the EU market and the Irish market, where x means export from the United States, m means use a multinational affiliate, and xp means export from the other European country. $[xp, m]$, for example, means that the EU market is served by an export platform in Ireland and Ireland is served by the multinational affiliate in Ireland.

Our simple three-country model has already generated six possibilities. We would need to compute the profit associated with each configuration to find which is most profitable. As the number of countries grows, the number of potential configurations becomes very large, very quickly.¹

2 Profits from serving the foreign market

We now proceed in the usual manner: Compute the profit a US firm earns in each configuration (#1–#6 above) and choose the configuration that generates the most profit.

Computing all six possibilities is tedious. To simplify things, we will make two assumptions.

Simplifying assumption 1: Europe is far from the United States.

Let $\tau_{us,eu}$ and $\tau_{us,ir}$ be so large that exporting from the United States is ruled out. The firm will use foreign affiliates to serve its foreign markets. This assumption rules out configurations 1–3.

Simplifying assumption 2: Ireland is low-cost compared to the EU.

Let $w_{ir} < w_{eu}$. As long as the difference in marginal costs is large enough, we can rule out building the affiliate only in the EU. The firm will prefer to build the affiliate in Ireland, where production is cheaper. This assumption rules out configuration #5.

We are left to study configurations #4 and #6.

Multinational affiliates in both countries (#4). The profit from serving both the EU and Ireland using foreign affiliates is

$$\pi_{us}^{m,m}(\varphi) = \frac{E_{ir}}{\epsilon_{ir}} \left(\frac{\epsilon_{ir}}{\epsilon_{ir} - 1} \frac{w_{ir}}{\varphi} \right)^{1-\epsilon_{ir}} + \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \frac{w_{eu}}{\varphi} \right)^{1-\epsilon_{eu}} - w_{ir}f^p - w_{eu}f^p. \quad (1)$$

The first term on the right-hand side is the profit from selling in Ireland from an Irish-based foreign affiliate; the second term is the profit from selling in the EU from an EU-based foreign affiliate; the

¹These *combinatoric* problems are an interesting branch of mathematics with broad applications.

third term is the cost of the Irish foreign affiliate; and the fourth term is the cost of the EU-based foreign affiliate.

In this case, the firm pays the cost of building two foreign affiliates and faces the marginal cost of production (w_i) in each location.

Multinational affiliate in Ireland, export to the EU from Ireland (#6). The profit from serving Ireland using a foreign affiliate and exporting from Ireland to the EU is

$$\pi_{us}^{xp,m}(\varphi) = \frac{E_{ir}}{\epsilon_{ir}} \left(\frac{\epsilon_{ir}}{\epsilon_{ir} - 1} \frac{w_{ir}}{\varphi} \right)^{1-\epsilon_{ir}} + \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \frac{w_{ir}}{\varphi} (1 + \tau_{ir,eu}) \right)^{1-\epsilon_{eu}} - w_{ir} f^p - w_{ir} f^e. \quad (2)$$

The first term on the right-hand side is the profit from selling in Ireland from an Irish foreign affiliate; the second term is the profit from selling in the EU from an Irish foreign affiliate; the third term is the cost of the Irish foreign affiliate; and the fourth term is the cost of exporting from Ireland.

In this case, the firm only pays for one foreign affiliate, and one export operation. Since we assume that $f^e < f^p$, the firm saves on fixed costs. Since the Irish foreign affiliate is exporting to the EU, the exports are subject to the trade costs, $\tau_{ir,eu}$. This is the proximity-concentration tradeoff, again.

3 Optimal strategy

How should the firm organize production? The firm would choose to build an affiliate in Ireland and export from there to the EU if it is more profitable to do so than to build a foreign affiliate in each country. Subtract (1) from (2) to yield

$$\pi_{us}^{xp,m}(\varphi) - \pi_{us}^{m,m}(\varphi) = \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \frac{w_{ir}}{\varphi} (1 + \tau_{ir,eu}) \right)^{1-\epsilon_{eu}} - \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \frac{w_{eu}}{\varphi} \right)^{1-\epsilon_{eu}} + (w_{eu} f^p - w_{ir} f^e). \quad (3)$$

The profit from serving the Irish market, and the cost of building the Irish affiliate, cancel out, since Ireland is served by an Irish affiliate in both cases. The first term on the right-hand side is the profit from exporting to the EU from Ireland, the second term is the profit from selling to the EU from an EU-based affiliate, and the last term is the savings from setting up the cheaper export facility rather than another production facility.

We can simplify (3) to yield,

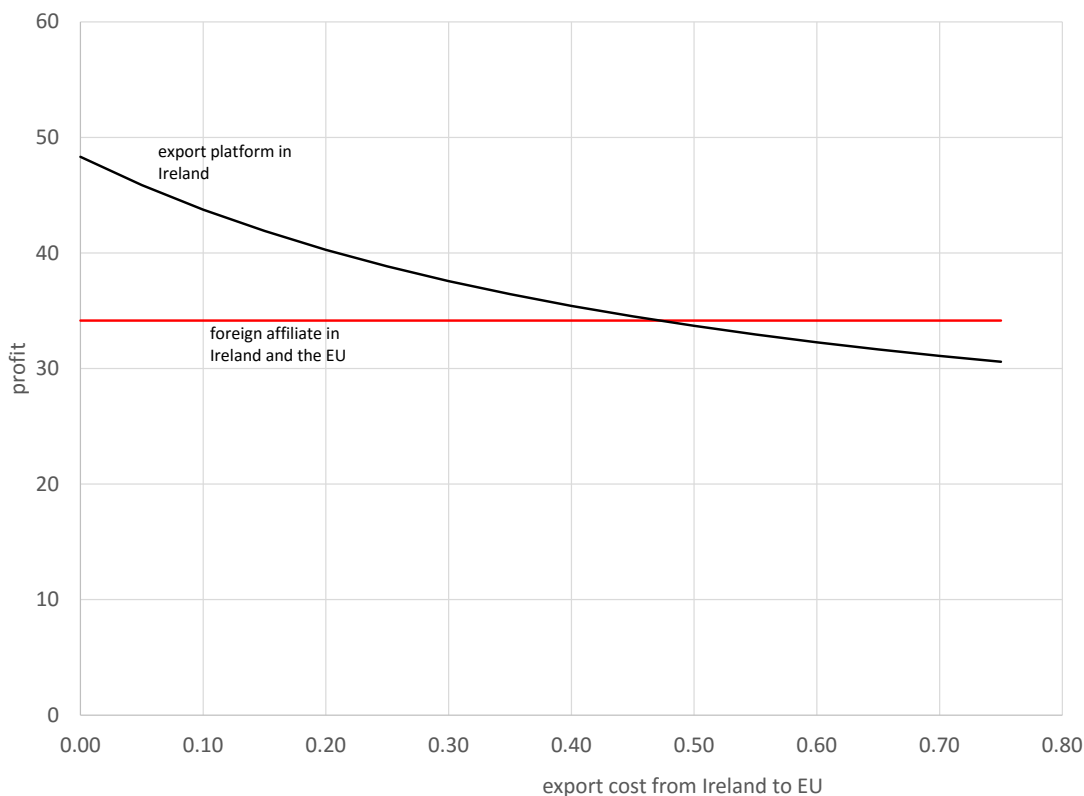
$$\pi_{us}^{xp,m}(\varphi) - \pi_{us}^{m,m}(\varphi) = \frac{E_{eu}}{\epsilon_{eu}} \left(\frac{\epsilon_{eu}}{\epsilon_{eu} - 1} \right)^{1-\epsilon_{eu}} \left[\left(\frac{w_{ir}}{\varphi} (1 + \tau_{ir,eu}) \right)^{1-\epsilon_{eu}} - \left(\frac{w_{eu}}{\varphi} \right)^{1-\epsilon_{eu}} \right] + (w_{eu} f^p - w_{ir} f^e). \quad (4)$$

This highlights the key tradeoffs. The firm saves fixed costs ($w_{eu} f^p - w_{ir} f^e$) by setting up export operations in Ireland rather than build another plant in the EU. The firm may lose market share in the EU, however, if it is costly to export to the EU from Ireland. This depends on

$$\left(\frac{w_{ir}}{\varphi} (1 + \tau_{ir,eu}) \right)^{1-\epsilon_{eu}} - \left(\frac{w_{eu}}{\varphi} \right)^{1-\epsilon_{eu}}, \quad (5)$$

which is the marginal cost of producing in Ireland and paying the shipping costs to the EU minus the marginal cost of producing in the EU.

Figure 2: Profits from different firm configurations



1. If there were no additional costs of exporting, $\tau_{ir,eu} = 0$, then it would always be best to use Ireland as an export platform. (Recall assumption #2: $w_{ir} < w_{eu}$.)

As $\tau_{ir,eu}$ increases, (5) will eventually become negative, which makes the first term on the right-hand side of (4) negative. When $\tau_{ir,eu}$ becomes large enough, (4) will become negative, and the firm would earn more profit by building a second affiliate in the EU.

2. The greater is the difference in marginal cost, the greater the export cost needs to be to rule out an Irish export platform.
3. The larger is the market in the EU (E_{eu}) the more likely the U.S. firm will use a foreign affiliate to serve the EU rather than use an export platform in Ireland.

In figure 2, we plot the profit from operating two foreign affiliates (1) and from operating an export platform (2) for different value of $\tau_{ir,eu}$. (In the plot, we are using the parameter values from the numerical example, below.) When the trade costs are small, it is more profitable to export from Ireland to serve the EU, than it is to operate an affiliate in the EU. As export costs grow, however, it eventually is profit maximizing to open the second affiliate in the EU.

Notice that, once we rule out exporting from the United States, the choice between an export platform or two affiliates embodies the proximity-concentration tradeoff. Ireland will export to the EU when the EU is small, or when the costs of exporting outweigh the extra fixed costs from operating a plant in the EU.

Numerical example.

Let $E_{eu} = E_{ir} = 100$, $\epsilon_{eu} = \epsilon_{ir} = 3$, $\varphi = 2$, $w_{ir} = 1.5$, $w_{eu} = 2$, $f^p = 2$, $f^e = 0.9$.

When $\tau_{ir,eu} = 0.2$, should the firm operate an export platform in Ireland or operate an affiliate in Ireland and the EU?

Using (1) and (2), we could compute profit from each configuration separately and compare them. Or, we could use (4) directly.

$$\pi_{us}^{xp,m}(\varphi) - \pi_{us}^{m,m}(\varphi) = \frac{100}{3} \left(\frac{3}{2}\right)^{-2} \left[\left(\frac{1.5}{2}(1.2)\right)^{-2} - \left(\frac{2}{2}\right)^{-2} \right] + (2 * 2 - 1.5 * 0.9) = 6.13$$

It is clearly better to use Ireland as an export platform.

Suppose Ireland decides to leave the EU, and Irish-based firms now face large EU import tariffs. Does your answer change if $\tau_{ir,eu} = 0.55$?

When $\tau_{ir,eu} = 0.55$, the difference in profit is now $\pi_{us}^{xp,m}(\varphi) - \pi_{us}^{m,m}(\varphi) = -1.20$. It is no longer worth operating an export platform in Ireland and paying the high costs to export. The firm would rather build an affiliate in the EU to serve the EU.

4 Summary

When do export platforms arise? Even in a simple three-country model, there are many ways the firm could organize production to serve the foreign markets. However, we expect to see export platforms when the

1. foreign markets (Ireland, EU) are far from the home market (US),
2. the export costs between the two foreign markets are small, and
3. one of the foreign markets has a substantially lower marginal cost.

Our analysis suggests that North American firms might look to places such as Ireland, Latvia, Estonia, and Hungary as destinations for export platform FDI. Production costs and tax incentives lower the marginal cost of production, while providing proximity to European markets.