

The Infant Industry Argument: a Critical Scrutiny

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Abstract

The discussion on infant industry intervention has been extensive and lengthy; the purpose of this paper is therefore to create a certain amount of clarity in the arguments presented by supporters of both free trade and protectionism. A literature survey is conducted to examine the initial ideas behind the infant industry argument, as well as discuss its possible benefits and main difficulties regarding implementation and performance assessment. A closer look is taken at the practicality of the argument by studying possible quantifications of the Mill-Bastable test and productivity growth measures. Findings include that infant industry intervention may be warranted under very strict circumstances while meeting a string of conditions. Without the presence of factors such as dynamic learning externalities, potential to mature and spillover effects; an infant firm operating under protection might never reach a level of international competitiveness and remain a burden on national welfare. Moreover, policymakers are often not able to assess these factors properly beforehand, which makes the decision on intervention extremely difficult and risky. However, the difficulty of implementation should not necessarily be a reason to deny developing countries their right to a more developed industrial sector.

Keywords: infant, industry, protectionism, trade, development, intervention

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1. Introduction

Ever since the infant industry argument was introduced by Hamilton and put into writing by List (1841) it has drawn attention of both free-trade economists and those supporting selective intervention. The discussion between the two camps has spanned over two centuries without any perspective on a consensus in the near future. This paper examines the infant industry argument from both a historic- and modern perspective, starting at the foundations presented by Friedrich List and continuing through the various alternations that have arisen over time. Moreover, by looking at the various forms of critique and the possibility to assess the performance of protected infant industries, this thesis tries add to the existing, theoretical literature. This paper scrutinizes the infant industry argument by not only examining the economic implications, but also taking into account political factors.

The discussion on infant industry intervention has been extensive and lengthy; the purpose of this paper is therefore to create a certain amount of clarity in the arguments presented by supporters of both free trade and protectionism. Policymakers in LDC's do often not take into account the right characteristics and are not aware of the conditions that need to be met when deciding to implement protective infant industry measures. One of the most complicated parts of infant industry analysis is the decision on which industry to protect and which industry to expose to free trade. Moreover, assessment of the performance of infant industries operating under protection often remains vague and theoretical; which is not directly useful to local governments or institutions. This policy paper tries to create clarity in the discussion of the infant industry argument by conducting a literature survey, analyzing conditions and circumstances that could possibly warrant intervention, examining potential risks and complications and distinguishing bad-performing infant industries from their successful colleagues.

Policymakers, politicians and economists have misinterpreted the infant industry argument on a regular basis and even abused it as an excuse in favor of protectionism. A vast amount of literature has been presented over the past 200 years, both in favor and against infant industry protection. Moreover, various suggestions and alternations have been presented over time to improve the results of infant industry implementation. This

all results in both literature and policymakers often neglecting the basic rationale behind the infant industry argument, often not visible to those wishing to judge on infant industry protection. Moreover, the amount of research available causes some academics and policymakers to not include previous alternations or suggestions that have been made in the past. Therefore, it is both interesting and essential to take a look at the core rationale behind the infant industry argument as proposed by List, stripping it from any alternations and taking a look at the essential ideas that support it. After that, one can look at possible implementation measures and adding factors that improve efficiency or that measure the success or failure of a protected industry. This thesis' main focus is therefore to present a literature survey that gives a sense of clarity to the vast amount of contradicting research that has been presented over time.

This paper will start by investigating the rationale behind the original, basic infant industry argument and comes to find that (mainly popular) literature is often uninformed while offering points of critique, regularly misinterpreting the argument in general or neglecting factors such as the condition that protection has to be of a temporary nature. The first chapter will go over the most important features of the basic infant industry argument and will draw up the historical example of the Industrial Revolution which gives an insight on how countries such as the United States and Germany protected their manufacturing industries in order to stimulate development.

After the initial base of the infant industry argument has been clarified, a short overview will be given with regards to the various forms of protection that are able to be implemented. While import substitution measures such as tariffs and quota have proven to be popular, economic literature makes a strong case for (direct) production subsidies which do not distort the consumption side of an economy. Subsidies however, are not always easy to implement due to possible fiscal, legal or political constraints, which in turn presents import tariffs as a second-best solution.

Throughout the past two centuries, various alternations and suggestions have been made attempting to make infant industry protection more efficient and economically valid. One of these suggestions is presented in the Mill-Bastable test, which is a logical argument that makes a case for comparing the costs of protection with the potential

cumulative future benefits on national welfare. While the Mill-Bastable argument is rather straightforward, it remains quite theoretical in nature which makes quantification relatively difficult, but not impossible when estimating fixed costs of learning (FLC). Moreover, the importance of (dynamic) learning effects whilst an infant industry is operating under protection is discussed extensively.

Naturally, the infant industry argument subject to heavy criticism of free-trade economists who argue that international trade should arise according to the principle of comparative advantage. Moreover, the fact that many developing countries are ruled by governments that are sensitive to lobbying and corruption can turn infant industry protection into a policy which is doomed to fail. This thought is emphasized by the uncertainty that industries might never mature, turning protection into a permanent instead of a temporary measure. Furthermore, an often heard point of critique is the fact that statistical proof supporting the infant industry argument is hard to obtain. This leads to the discussion on how to measure and assess the performance of infant industries under protection, which in the simplest case come down to a statement of relative productivity growth under protection, in association with the effective rate of protection (ERP).

While the financial crisis of 2008 should not have a direct impact on the current validity of the infant industry argument (i.e. an infant industry remains an infant and its learning potential does not change), it is interesting to take a brief look and discuss whether there are circumstances in the current economic climate that argue in favor or against infant industry protection. Lastly, this paper will finalize with some concluding remarks regarding the current status and validity of the infant industry argument.

2. Foundation of the Infant Industry Argument

Over the past centuries many economists have given thought to the topic of protecting certain industries from (foreign) competition. While forms of protection come in endless shapes and sizes; the case of the infant industry argument has drawn particular attention and is, -after various alternations over time-, still a much debated topic between both economists and politicians. This chapter will explore the definition and

founding of the infant industry argument and discusses the historic example of infant industry protection during the Industrial Revolution.

2.1 Definitions and Initial Founding

For the sake of clarity a definition of an infant industry or firm, derived from List's literature, is presented below:

An infant industry can be defined as a type of industry which is in its early stages of development; potentially in need of some form of protective measures in order to survive and successfully compete with (foreign) mature competitors (List, 1841).

While Alexander Hamilton (1790) was the first economist to articulate and expose the reasoning behind protecting infant industries, it was not until 1841 that the idea was developed further into the respective argument by Friedrich List in his book "The National System of Political Economy". List describes the necessity to protect underdeveloped domestic industries from developed, foreign competitors. The infant industry argument has since then manifested itself as one of the most notable theories in favor of protection.

List and Hamilton argue that distortion of free trade is warranted when protecting relatively small firms in less developed countries (LDC's). It can be argued that these industries have difficulties competing with fully established firms that have evolved in developed countries. The latter have the advantage of being in the business longer and subsequently enjoying from the gained expertise and efficiency when producing a particular good. In many cases this enables the foreign competitor to offer the same good at a much lower price, while maintaining profitability (Suranovic, 2010).

A certain degree of homogeneity of the offered products implies a sincere disadvantage to small producers in less developed countries, due to the fact that these firms do not benefit from the same level of technology, expertise and efficiency. Forcing these firms to compete head-to-head with their (international) competitors would inevitably lead to losses for the LDC firms, causing them to exit the market (List, 1841).

Supporters of the infant industry argument argue that the protection of such industries in less developed countries provides firms with the amount of time needed to develop themselves further. After reaching a certain level of maturity, firms are ought to be able to compete with their international competitors and free trade can be restored. While protection comes in various forms, the common consequence is that nearly all measures lead to increased domestic prices¹ once an industry benefits from protective policies. This temporary increase in domestic price gives the infant firms the possibility to cover their higher production costs while not being forced to leave the market. In the meantime, they gain a certain level of efficiency and expertise which in time enables them to compete directly with their international competitors. In essence, the infant industry is given a chance to mature in a similar fashion as their foreign peers have done in the past; without any external distortion (Suranovic, 2010).

During this time of protection an industry is ought to grow up and slowly become able to compete with foreign competitors. Over time the protected infant firms would have gradually become more efficient; allowing protective measures to be reduced until free trade is restored.

While many economists supporting free trade have described List as opposing free trade or export expansion, it must be noted that List foresaw free trade as the ultimate goal for all nations (Shafaedin, 2000). The protective measures that arise from the infant industry argument must be temporary and primarily a vehicle eventually leading to development.

2.2 Initial Justification

As noted before, List was not the first economist to argue in favor of some form of protectionism. However, he managed to formulate his reasoning in an understandable, comprehensive package while basing his findings on established theories of economists such as Hamilton and Smith (Schumpeter, 1952).

It is important to note that List based his infant industry rationale on the idea that countries go through various stages of development, starting from the savage stage (1) to

¹ There are some notable exceptions, such as subsidy measures, which are dealt with later on in this thesis.

the pastoral (2) and the agricultural stage (3); after which countries are industrializing into the manufacturing stage (4) and eventually reach the commercial stage (5) (List, 1841). The infant industry argument is partly based on the fact that (less developed) nations are not able to follow these steps naturally (Shafaedin, 2000).

Bearing these proposed development stages in mind, List noted the uneven industrialization of Great Britain versus, for example, continental Europe. In his book (1841) List continues that as long as countries are not on par in terms of industrialization level, it might be beneficial for less industrialized countries to protect certain (infant) industries in order for trade to be fair. Free trade is only advocated once all countries reach a similar level of (industrial) development.

To allow this policy proposal, national- and universal interests had to be separated. List believed nations to have preferences and interests other than universal interests; which in turn contradicts with Smith's theory on free trade (Viner, 1953). While economists such as Smith argue that any given nation would strive the same, universal goals; List separates individual, national and universal concerns. This assumption allows countries or regions to respond or act individually according to their own interests. List assumes that Smith's arguments for free trade based on absolute comparative advantage relate to universal interests, while nations might aim for development or "productive power" (Shafaedin, 2000). This aim for development might lead to nations temporarily protecting their own industries from foreign competition in order to pursue national interests, before focusing on the cosmopolitan economy.

In contrast to the trade ideas of classical economists, which are based on Ricardian (static) comparative advantage, List's theory is based on dynamic comparative advantage. Static comparative advantage measures the comparative advantage of a country at one point in time, implying an ideal solution at the initial measuring point. It can be argued that it is also interesting to look at the long-run interests. For example, many LDC's are often heavily reliant on the agricultural sector and would therefore have a (static) comparative advantage in this sector. Due to the historically volatile nature of prices of agricultural goods, this comparative advantage could impose a risk on LDC's

over time. Moreover, many policymakers believe that the skills needed to build an industrial economy are different from those in agriculture, implying that concentrating solely on sectors with a comparative advantage would hinder the development of an industrial economy (Suranovic, 2010). According to List and his followers, infant industry protection would allow learning effects while industries become more efficient and generate a positive effect on the overall economy over time.

Lastly it must be noted that List did take into account the difficulties of the infant industry argument in smaller nations (Yaffey, 1998). However, increased efficiency in the agricultural sector would, -also in small countries-, cause a surplus in labor which should be absorbed by the manufacturing sector in order to develop the economy into the industrialized stage. While small nations deal with a limited domestic market, List proposes various solutions which support the implementation of infant industry protection, such as the formation of so-called “alliances of interests” with other regions or nations.

2.3 Case: Industrial Revolution

While looking at the historic perspective and the justification of the infant industry argument developed by List in the 19th century, it is interesting to briefly look at one of the most famous examples of (successful) infant industry protectionism: the Industrial Revolution. This gives some perspective on how infant industry protection was initially implemented around the times List was developing his ideas.

During the Industrial Revolution (18th and 19th century), hardly any nation managed to industrialize without any form of infant industry protection (Shafaedin, 1998). Many countries protected their manufacturing industry behind tariff barriers and lowered protectionism once maturity was reached. The first country to industrialize was Great Britain, after which the United States and European countries followed.

While many (free trade) economists believe that this development in the United Kingdom can be solely attributed to technological progress and increased efficiency (Marshall, 1920); it can be argued that the rapid changes were helped by the fact that

Great Britain was protecting its industry from foreign competition by means of tariff protection. This protection was already in place before the start of the Industrial Revolution and was initially imposed to generate some extra income (Davis, 1966). Over time, tariffs increased steadily and peaked at the height of the Industrial Revolution (1760-1840) at approximately 50% (see Table 1). While List supports the argument that these tariffs have helped the development of the British industrial sector, economists supporting free trade theorems such as Smith (1776) believe England managed to industrialize despite these protective measures, viewing them as disadvantageous, rather than beneficial. Nevertheless, the fact remains that Great Britain industrialized its manufacturing industry behind tariff walls, temporarily protecting an infant industry before maturing. In the table on the next page, it is shown that the United Kingdom had the highest tariff rates (50%) in the early 1800s, before lifting its trade barriers.

| <i>Tariffs on Manufactured Goods</i> | | | | | |
|--------------------------------------|------|------|------|------|------|
| <i>Country</i> | 1820 | 1875 | 1913 | 1931 | 1950 |
| Austria-Hungary | n/a | 17.5 | 24 | 24 | 18 |
| Belgium | 7 | 9.5 | 9 | 14 | 11 |
| Denmark | 30 | 17.5 | 14 | n/a | 3 |
| France | n/a | 13.5 | 20.5 | 30 | 18 |
| Germany | 10 | 5 | 13 | 21 | 26 |
| Italy | n/a | 9 | 19 | 46 | 25 |
| Japan | n/a | 5 | 30 | n/a | 9 |
| Russia | n/a | 17.5 | 84 | n/a | n/a |
| Spain | n/a | 17.5 | 37.5 | n/a | 37 |
| Sweden | n/a | 4 | 22.5 | 9 | 22 |
| Switzerland | 10 | 5 | 8.5 | n/a | 8.5 |
| The Netherlands | 7 | 4 | 4 | 11 | 3 |
| Great Britain | 50 | 0 | 0 | 23 | 0 |
| United States | 40 | 45 | 44 | 14 | 33 |

Table 1 – Tariffs on Manufactured Goods; Source: Bairoch (1995) and Shafaedin (1998)

It is interesting to see that the United Kingdom was effectively implementing (parts of) the infant industry theory, by developing its manufacturing industry behind trade barriers and liberalizing once the industry was matured. Moreover, while U.S. politics traditionally support free trade policies, it can be observed that its manufacturing industry benefitted from protectionism during the 1800s, after which tariffs were lowered and trade was further liberalized. However, the consequences of the Great

Depression and 2 World Wars caused tariffs to (temporarily) rise to one of the highest in the world.

While the United States and the United Kingdom were taken as examples from the early industrializers, all other countries mentioned in the table successfully developed their industries behind tariff barriers before (somewhat) liberalizing their policies. When looking past the times of the Industrial Revolution, it is interesting to see that nearly all countries have used some form of infant industry protection when going through the various stages of development as proposed by List. In his working paper of 1998 Shafaedin mentions that even in later history no country has managed to develop an industrial base without some form of infant industry protection, with the exception of Hong Kong; which was ironically advocating the British post-revolution ideal of trade liberalization.

3. Implementation and Measures

After discovering the roots of the infant industry argument and its initial justification, it is interesting to look at some measures which can be implemented once a government decides to protect (some of) its infant industries. As stated earlier, protections comes in various forms and below some of the most popular structures are being discussed. Since most of the import substitution (IS) measures have the common consequence of (temporarily) raising the domestic price of a good and therefore have similar implications, the most widespread tools will be treated (tariffs and import quota). Lastly, the separate case of subsidies will be clarified.

While cases below are mainly a result of implementing general economic rationale, gathered throughout education of the author and are therefore “according to textbook”, graphics and recommendations are based on literature provided by Perkins et al. (2006) and Suranovic (2010).

3.1 Import Tariffs

One of the most famous and most widely used forms of protectionism is the use of import tariffs, which is one of the most direct ways to make imported goods more expensive in the domestic market.

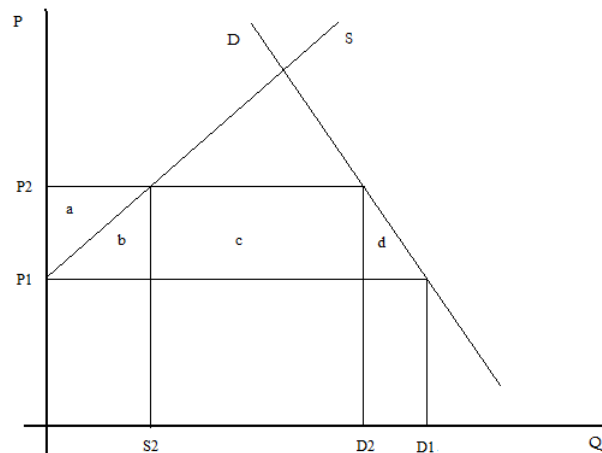


Figure 1 – Tariff Protection; Source: constructed for this paper by author (2011)

In the figure above, the demand and supply of a particular (manufactured) good is shown which has a world price of $P1$. In the case of free trade, this particular good would be available in the domestic market at the world price of $P1$, indicating that the domestic supply curve is actually too high to produce the good. I.e. the world price is lower than the price domestic suppliers can offer the good and the entire domestic demand ($D1$) is imported. When assuming the industry is an infant industry and therefore protected by import tariffs, the price will be raised to $P2$ (the tariff being equal to $P1 - P2$). Due to the raise in price, domestic supply is stimulated and is now accountable for a production of $S2$, while demand falls to $D2$ and imports fall to $D2 - S2$.

Figure 1 gives a representation of the consequences of an import tariff during one period in time and gives a quick and easy overview of the effects on national welfare. The consumers of the good are obviously hurt by the higher prices paid for the same good (consumer surplus), while producers benefit from an increased producer surplus and the government gains from extra generated tax revenues. Since consumer surplus is

diminished by $-(a + b + c + d)$ and only producer surplus ($+a$) and government revenue ($+c$) are increased, the net effect on national welfare remains negative ($-b - d$), representing losses in production efficiency and consumption efficiency, respectively.

Now, according to the infant industry argument, there is a certain learning process involved during the temporary period of protection; leading to gains in production efficiency. To show this effect, it is interesting to look at the dynamic effects of infant industry protection over time instead of solely the period when the protective measures are implemented. Though tariffs are generally removed gradually over time, for simplicity in Figure 2 it is assumed that the tariff of $P2 - P1$ is removed entirely and that the increased production efficiency causes the domestic supply curve to shift downwards (i.e. efficiency gains cause a drop in production costs).

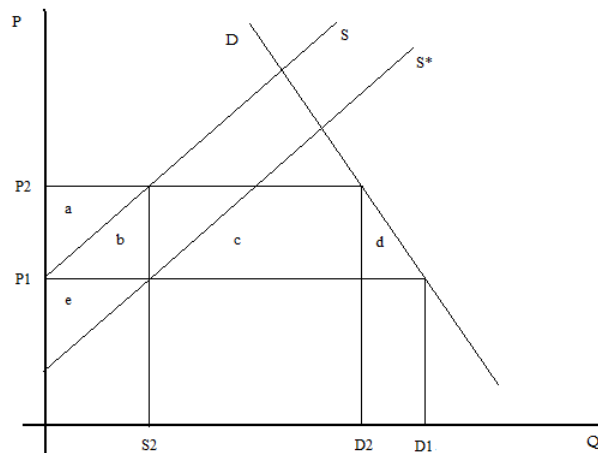


Figure 2 –Tariff Protection and Learning Effects; Source: constructed for this paper by author (2011)

In this (simplified) example, there is one period of protectionism and a second period where free trade is restored. Once free trade is restored, production efficiency has caused the supply curve to shift from S to S^* while demand increases to $D1$ and domestic supply is still given by $S2$. The level of imports increases with respect to the period of protection to $D1 - S2$.

Since consumer surplus and government revenue are back to their pre-tariff levels, one could argue that the static national welfare is increased by the same amount as the increased producer surplus ($+e$). However, it is more interesting to look at the overall welfare effects measured over two periods of time. From the period protected under the infant industry argument, negative national welfare effects are shown to be $(-b - d)$. Taking into account the increased production efficiency and producer surplus ($+e$) once free trade is restored, the dynamic welfare effects account to $(+e - b - d)$. This would mean that, over two periods in time, the amount of extra production efficiency has to outweigh the welfare losses of the period of protection in order for the infant industry argument to have a positive effect on welfare. However, List argues that these efficiency gains would prevail over time, and perhaps increase gradually. This would mean that it might be possible for an industry to earn back welfare losses of the period of protection over an extensive period. In that case, the dynamic welfare effects would account to $(n * e - b - d)$, where n stands for the total periods of time.

Moreover, there are economists that argue that these gains in producer surplus cause learning effects that can spillover to other industries, creating increased efficiency in other sectors as well (Suranovic, 2010). This in turn would give these firms a better position to compete with peers across the globe and potentially increase exports and domestic sales.

3.2 Quotas

Another possibility for a government is to impose quantitative restrictions on the amount of goods that are allowed to be imported. If a quota limits the amount of imports to the same level as a tariff does, the two policies have very similar effects and losses on welfare are the same. Since a quota raises the domestic price and stimulates domestic production in the same manner as a tariff, the deadweight loss, loss in consumer surplus and added production efficiency are identical.

However, there are some potential differences between the implementation of quotas and tariffs, due to the fact that many governments give away their quota license at no charge. This implies that there is no additional (government) revenue, whereas

importers can purchase the imported goods at the world price P_1 while selling domestically at P_2 , benefitting from so-called quota rent. Alternatively, governments can sell the rights to import by holding auction; with importers willing to pay as much as area c in Figure 2 on page 10, which equals to the amount of quota rent they could potentially have earned. In this manner, the government makes the same amount of revenues as from an import tariff and the overall effects on national welfare are once again identical.

Lastly there is one notable difference between the implementation of quota and tariffs. Under tariff protection, a fall in world price leads to a fall in domestic price through increased imports. In contrast, quota protection requires imports to be at a particular level and a decrease in world price would simply lead to a greater quota rent for import license holders. The ability to react to changes on the world market, causes many economists and policymakers to prefer tariff protection over quotas (Suranovic, 2010).

3.3 Subsidies

It is explained that, generally, tariff protection is preferred by many economists over protectionism through quotas. In turn (direct) subsidies are often considered to be a better alternative than tariffs. Figure 3 once again shows the same supply and demand curves as seen before and the level of imports initially being equal to D_1 , since the initial domestic supply curve S is too high to warrant any production.

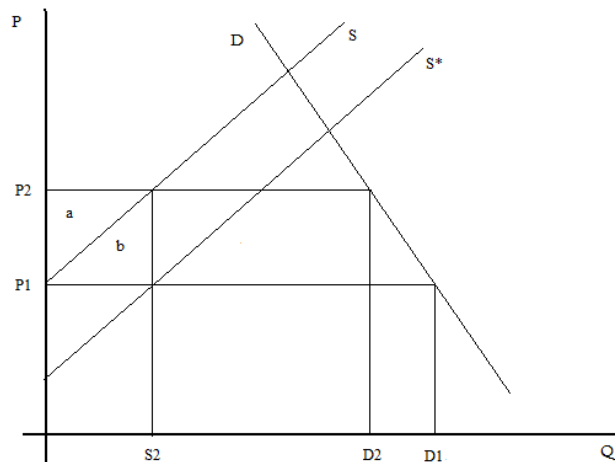


Figure 3 – Subsidies; Source: constructed for this paper by author (2011)

In the case of production subsidies, a government could give a subsidy equal to $P_2 - P_1$ which would raise domestic supply to S_2 while consumers pay the same world price of P_1 . Demand would stay equal to D_1 and imports would fall to $D_1 - S_2$, while the consumer side remains completely undistorted.

Due to the fact that consumers are left unaffected, the static effect on consumer surplus is 0, whereas producer surplus rises as a result of subsidies being sufficient enough to initiate production ($+a$). However, government revenue is negative ($-a - b$) which causes the overall national welfare effect to be negative ($-b$). Nevertheless, the overall losses are lower than both tariffs and quota, making subsidies more attractive to implement, assumed that the dynamic efficiency and spillover effects over time are similar.

3.4 Additional Comments

Tariffs, quotas and subsidies are only a small sample of policies that can be implemented to protect a country's domestic industries. However, the fact that infant industry protection requires the protection of selective industries, instead of a country's domestic market as a whole, make tariffs, quota and subsidies among the most widely used tools for selective protection. Other examples of protectionism such as exchange rate management can be very efficient and extremely powerful, but tend to target the entire domestic market and have an influence on price levels across the entire economy. This contradicts with one of the most important points of the infant industry argument which states that not all, but only a careful selection of industries should be protected during a temporary stage throughout an economy's development process.

The past two chapters have looked at the initial founding of the infant industry argument and its justification by putting it into a historic perspective and the most common (basic) implementation policies. The next chapter will focus on the alternations that have been made to the infant industry argument over time. The economic climate changes constantly which causes policymakers to shift and adapt their ideas, which also applies to the approach towards the infant industry argument. Moreover, after looking at the possible positive consequences of infant industry protection; the next chapters

will also deal with some points of critique and will deal more extensively with possible negative effects on welfare.

4. Alternations to the Infant Industry Argument

Over the years much literature has appeared with regards to the infant industry argument. This chapter deals with some interesting proposed alternations and suggestions that have come up since the idea was initially proposed by List and Hamilton. John Stuart Mill was one of the first economists proposing some additional criteria that have to be met when implementing protective measures of infant industries. These criteria are very much in line with List's initial proposal and include the fact that protection should be temporary and that the protected industry should at some point in time become self-sufficient without protection (Mill, 1848). A logical extra condition was set a few years later by Bastable (1891), stating that the total benefits of protecting one particular industry should outweigh the net costs to society.

In order for the Mill-Bastable conditions to hold, the assumption is made that “practice makes perfect”, with firms experiencing learning benefits from their own experience and peers (Kemp, 1960). Bastable argued that industries should be protected once they meet both the criteria set by Mill and by himself, fulfilling a so-called Mill-Bastable test. In order to meet these requirements, industries must be subject to dynamic learning effects which possibly lead to spillover effects to other industries.

4.1 Learning-by-Doing

As seen in the previous chapter, the industry of a LDC only starts to benefit from infant industry protection once the supply curve has sufficiently shifted downwards. While benefitting from protection, the industry has to become more efficient by means of learning-by-doing (Young, 1991). Arrow (1962) was one of the first economists that developed the idea that the cumulative output of an industry has a positive effect on an industry's overall efficiency. I.e.: the growth of an (infant) industry would in time be positively correlated to its learning effects. These findings have been greatly popular by

later policymakers who have taken these conclusions as a basic assumption when developing their own models, such as Bardhan (1971) and Young (1991).

Research has shown that, assuming learning-by-doing effects are present, protection in the form of subsidies could in fact have a positive effect on the long term growth of a less developing country. Young's results even indicate that free trade would cause lower rates of technical progress in LDC's compared to a situation where some (infant) industries would benefit temporary protection in the form of a subsidy. Moreover, technology gaps between developed nations and their LDC trading gaps are likely to increase under free trade. While research based on Arrow's (1962) findings has often be related to the discussion of protectionism in general, the conclusions made regarding the importance of learning-by-doing effects are very applicable to the infant industry argument.

By now it is relatively clear that learning-by-doing effects are an important condition that could possibly warrant infant industry protection. After economists such as Bardhan (1971) successfully pointed out the necessity of learning-by-doing; studies of Succar (1987) and Young (1991) have examined the impact of spillover effects to other industries. This means that these dynamic learning experiences must be partially external to the firm being protected. It can be argued that in the case of appropriable learning effects (i.e. learning effects only apply to one particular firm), the costs of learning would be followed by disproportionately large profits and could be financed by a well functioning capital market (Meade, 1955). Due to the fact that this solution would not have a negative affect consumption or government, the absence of spillover effects would not warrant intervention. This all goes under the assumption that the acquired knowledge is freely available to all industry participants (Grubel, 1966).

By now some views have been presented which lead to a general consensus regarding two broad conditions that have to be met when looking at infant industry protection:

- Dynamic, learning-by-doing effects must be present in order to make a downward shift in the supply curve.

- The acquired learning experience must have some external effects to other firms or industries. This can apply to both intra-industry and inter-industry LBD economies (Succar, 1987).

4.2 Applications of the Mill-Bastable test

Having viewed the initial arguments of List and Hamilton, Mill-Bastable's implications and the results of later research highlighting the importance of dynamic learning, it is interesting to put all these conditions in the perspective of a policymaker considering to protect a certain industry. While the economic literature has been relatively straightforward and has pointed out the potential positive welfare effects, it is hard to foresee the future costs and benefits that come with infant industry protection. The previously mentioned Mill-Bastable test is a fair way to assess a policy decisions, but a cost-benefit analysis is not easy to make due to the fact that learning effects affect this analysis over time (i.e. costs and benefits are not a constant factor as learning takes place). Moreover, the costs of protection are likely to diminish over time due to the fact that protection is ought to gradually decrease.

As demonstrated earlier, subsidies are often preferred over other forms of protection that distort the consumer side of the market. However, since infant industry protection is mainly interesting for LDC's, one has to take into account that the respective governments might have certain monetary constraints that make subsidies impossible. Next to that, economic literature tends to assume that changing polices from import substitution to subsidies is effortless and costless, whereas in reality this does not necessarily hold true Melitz (2005).

Marc Melitz (2005) develops an interesting model which shows which factors should be taken into account once a policymaker decides to protect its infant industries. Hereby, the model shows how the Mill-Bastable test can be applied when assessing various forms of protection. This is done while respecting the ideas in the previous chapter regarding the importance of learning- and spillover effects. The cost-benefit analysis can be approximated by looking at the presumed learning costs, after which a reasonable estimate can be made of the subsequent benefits.

Melitz characterizes the learning function as $c_t = c(Q_t)$, where marginal costs c_t should be decreasing to a level of \bar{c} while total production Q_t increases due to the learning-by-doing theory. Moreover, the industry should mature after the learning process has completed and a certain amount of the good is produced (\bar{Q}_t). The literature argues that the total costs and potential benefits of protection, based on fixed learning costs (FLC), depend on total learning prospective and the pace at which a specific industry can be taught.

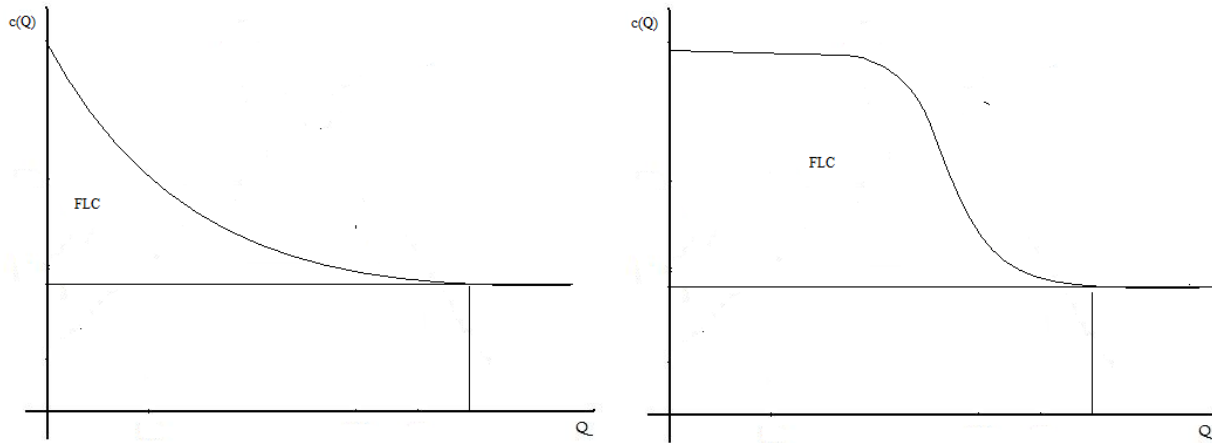


Figure 4 – Learning Effects and Fixed Learning Costs (FLC); Source: constructed by author (2011), based on Melitz (2005)

Figure 4 above gives a simple graphical representation of the importance of the pace at which an industry can acquire new skills. While both cases represent a certain level of learning potential and marginal costs eventually decrease to the ultimate level of \bar{c} (the horizontal line), the industry on the left hand side shows a much steeper learning process. The fact that an industry is capable of learning certain skills at a faster pace, causes the fixed learning costs (FLC) to be much lower, eventually imposing a lower burden on total welfare.

As discussed earlier, stimulation of infant industries is preferred to come in the form of subsidies. Due to this reason, Melitz (2005) argues that policy makers initially have the choice of choosing between protection through subsidies or not protecting an industry at all (and not creating an domestic industry while relying on imports). The outcome represents the choice that maximizes total welfare, which can be viewed as cumulative

welfare over time. Since the Mill-Bastable test is a cost-benefit analysis, it would prescribe the choice that generates the highest welfare flow over future time periods. Due to the fact that the time horizon is extensive and the industry has shown learning potential, the fixed learning costs are eventually earned back over time; making subsidies a more interesting alternative than not creating a domestic industry at all. However, one must carefully observe both the learning pace and the amount of initial costs to prevent the payback-period from becoming too long. If the latter is the case and a breakeven point would only be reached after an extremely long period of time, subsidies (and protection in general) are not desirable.

The results from Melitz' research show that the Mill-Bastable test might give a warranty for intervention due to the fact that cumulative welfare over time is higher than in the case of no protection. However, one should also take into account that subsidies are often not possible due to fiscal- or policy restrictions. In that case, economists often refer to tariffs as a second-best alternative which in fact may not necessarily be the case at all times. While fixed quotas have severe disadvantages that are described earlier, they do offer a certain level of flexibility and do not need to be adjusted while learning progresses. While tariffs and subsidies constantly have to be lowered, fixed quotas have the advantage of automatically lowering protection as the costs of the domestic industry decrease (Melitz, 2005).

Lastly, a positive outcome of the Mill-Bastable test does not automatically justify intervention in a particular (infant) industry. One should carefully look at the cumulative learning potential and the steepness of the learning curve. It should not be the case that the time horizon has to be extended to infinity in order for national welfare benefits to outweigh the learning costs. Bearing in mind that learning should be bound and therefore finite, the time horizon should not be extended to an extreme; implying that some industries in a nation are better off relying on imports.

5. Criticism to the Infant Industry Argument

As discussed extensively in previous chapters, economic literature has often criticized the (classic) infant industry argument by stating that protection in the form of subsidies

is much more efficient than import tariffs or quotas. In this section below some other interesting points challenging the infant industry argument are presented and discussed.

One of the major points of critique opposing the infant industry argument is the fact that it can cause various kinds of rent-seeking behavior. Many governments simply have difficulties determining which industries to protect or expose to free trade. This can cause firms or lobby groups to take advantage of the situation by presenting a number of reasons that support the protection of their domestic industry from foreign competition. The presence of lobbying makes it even more difficult to take out those industries that actually need protection from those that can survive in a free trade environment. Panagaryia (2011) argues that many governments of less developing countries are not disciplined enough to resist these arguments and often do not have the resources to investigate important conditions that could warrant intervention such as learning potential and spillover effects.

As previously mentioned, Maede (1955) introduced the importance of these learning externalities to other firms. While critics generally agree that this is an improvement compared to learning that is completely internal to the firm, free-trade economists still do not support the argument as compelling enough to validate intervention. Economists such as Baldwin (1969) argue that a costly innovation or learning experience that creates learning externalities to other firms would cause firms not wanting to be the first entrant in the new market. It is only logical to assume that most firms simply want to benefit from spillover effects without having to deal with the expensive innovation costs. This argument does not only hold for technological progress, but can also be suited to other learning experiences such skilled labor (training costs).

Free trade economists often mention the likelihood of protection becoming a permanent burden, instead of a temporary measure as proposed initially by List and Hamilton. Once a domestic (protected) industry starts to experience learning effects, becoming more efficient and starting to produce more products, it often automatically generates additional power. By the time the industries have matured and protection is ought to be

dropped, these industries have acquired a certain presence in the domestic market and can put pressure to governments in order for protection to stay in place. Often this pressure is paired with a certain amount of attention to which politicians could be sensitive, creating a risk that protection of certain industries is getting a permanent, instead of a temporary character. Next to that, import barriers or subsidies are not always popular with the international community and a country's trading partners. Therefore, infant industry protection might lead to imposed export barriers or trade restrictions having a negative impact on the economy as a whole. This answer of the international community can cause such a drawback on national welfare that it can outweigh the benefits that the infant industry protection was initially supposed to create.

Another argument that points out the risks of implementing protective measures of infant industries is the risk that the protected industry will never mature relative to its foreign peers. One famous example of this is presented by Eduardo (1995) and shows the unsuccessful infant industry protection of the Brazilian computer industry. While the industry definitely showed learning potential and was almost certain to generate spillover effects, the technological gap between the computer industry in Brazil and the rest of the world was only increasing over time. This example is strengthened by the Hoff's findings (1997), stating that agents acting within the protective industries do not have to compete with world players that make use of cutting-edge technologies and dynamic learning effects. Due to the lack of incentive to innovate, the protected domestic industry can opt for more traditional, older and less efficient technology. Free trade economists argue that in a well-functioning free market without protection, technology spillovers coming from developed regions are often relatively easy to obtain, making protection unnecessary, inefficient and expensive.

The simple argument of economies of scale is also one to take into consideration. While many LDC's are of a respective size and domestic market, there are still many nations that are relatively small compared to their (developed) trade partners. Supporters of the infant industry argument present diminishing marginal costs as a consequence of learning experiences as a function of time and quantity produced (Grubel, 1966).

However, small nations might not have a sufficiently large domestic market for marginal costs to drop to an appropriate level. Therefore, countries could potentially form an alliance with other nations that are encountering similar problems. However, even assuming two or three smaller LDC's are in the same situation and could potentially form an alliance based on economic reasoning; a wide variety of political or even historical reasons can prevent this from happening.

While critics of the infant industry argument are mainly supporting the theory of comparative advantage as a model for free trade, several suggestions have been made to improve infant industry policies. One of these suggestions is obviously the use of subsidies rather than tariffs or quota, but political constraints or limited fiscal funds might make this impossible. In that case, tariffs often arise as a second-best alternative. The fact that a government might not have sufficient funds to provide a direct production subsidy does not mean that it has to generate a net revenue from its protective measures (Grubel, 1966). Instead, governments can make sure their net revenue remains zero by simultaneously implementing a policy of import tariffs and subsidies (when possible). The revenues coming from the import tariffs could be used for a (direct) production subsidy, leading to less distortion on the consumption side of the economy.

Furthermore, suggestions improving the overall performance of infant industries include ideas to only subsidize industries that have a certain export potential. This would at least cause governments to select particular industries that are relatively close to their own comparative advantages (Panagariya, 2011). Moreover, it would force domestic producers to expose themselves to- and compete with world producers that make use of the most efficient technologies and have successfully become mature. As described above, this is a sharp contrast to the more inward-looking policies, which do not always provide the best incentives to absorb the most recent technologies and skills.

Another argument that is often heard from supporters of the free trade argument is that econometric proof assuring the necessity of infant industry protection is scarce and difficult to find. Panagariya (2011) argues that protection of infant industries does not

warrant reduction of poverty and economic growth. This is in contrast to free trade literature, which presents certain relationships between free trade and economic growth (Frankel; Rose, 2002). The next chapter will give a bit more insight in the various ways in which infant industry performance can be assessed, presenting conflicting ideas regarding proof of infant industry success than those mentioned by Panagariya.

6. Measuring the Performance of Infant Industries

As discussed in the previous chapter, skeptics of the infant industry argument have questioned whether protection would realize the goals necessary to warrant intervention. Moreover, proof that supports the argument in the form of statistical evidence is often hard to obtain. This chapter will give an insight on how the performance of infant industries can be assessed and will conclude with a small case study of infant industry protection in Turkey during the 20th century.

6.1 General Comments

According to research presented by Bell et al. (1984), it is important to assess the start-up costs of industries, such as production plants, in order to estimate a time horizon at which maturity can be reached. This path could then be compared to production costs of foreign competitors to determine the performance of the domestic infant industry relative to their peers abroad. However, the exact startup costs of an industry and quantitative data of learning costs is extremely hard to obtain, making this kind of Mill-Bastable assessment nearly impossible. The actual costs of infancy and the benefits of maturity are very hard to estimate and analyze. The previous chapter mentioned a method of applying the Mill-Bastable test developed by Melitz (2005), but an actual application of the model in reality remains difficult. Research of economists such as Balassa (1971) and Little (1972) also makes an attempt to investigate the costs of protection, but lacks the information over time which is needed to make a concise conclusion when assessing the performance of an infant (Bell et al., 1984).

Therefore, a second best alternative can be introduced which examines the rate of productivity growth of the protected industry while drawing a comparison with

unprotected industries in other countries (Bell et al., 1984). As an alternative one can look at the changes in productivity levels of infants during a period of protection. This view suits the traditional literature which states that infant industries should only require a temporary period of protection in order to become more efficient, consequently increasing productivity during that time frame.

Much of the research that has been done regarding the productivity of infant industries has focused on one particular industry or example. Bell et al. (1984) has summarized the results of various decades of research, presented in Table 2. While some of the analysis only focuses on the productivity growth rate of specific factors (capital, labor), it still gives an interesting overview of the productivity performance of various infants that are operating under some form of protection.

One of the first conclusions that can be drawn when looking at the results presented in Table 2 is the extreme variety in levels of performance. Successful examples include those of a steel plant in Brazil, which reached full capacity within years after opening in 1966 which resulted in tremendous increases in productivity due to the fact the same level of capital was generating an increasing amount of output (Dahlman, Fonseca, 1978). On the other hand, there are cases known that have dealt with decreasing levels of productivity, such as firms producing electrical machinery in India and an example from the textile industry in Tanzania.

The majority of the firms presented however, show a modest productivity growth while being under protection. Now, the question arises whether modest productivity growth is sufficient in order to mature compared to international peers and reach international competitiveness. In order to do this, a sensible comparison has to be made between a protected infant and a mature, unprotected player abroad. This direct comparison is unfortunately not easy to make (Bell et al., 1984). Therefore, it is interesting to examine evidence that suggests that mature firms in developed countries often experience productivity growth rates ranging from 1 to 3% annually with a mean of approximately 2% (Nishimizu, Robinson, 1984). A rough comparison therefore concludes that only a part of the infant industries represented in Table 2 experience higher levels of

productivity growth than their mature peers abroad. Moreover, one should inevitably also look at the total time that is needed for an industry to catch up and mature. When assuming the positive case of infant industry productivity rate growth of 5% and costs per unit initially twice the world level, while foreign competitors experience the previously mentioned 2% growth, it will take 23 years for an infant industry to catch up (Bell et al., 1984). Logically, this time frame will only increase as productivity growth rates are lower than 5%, as seen in various cases in Table 2.

| <i>Country</i> | <i>Industry</i> | <i>Period</i> | <i>Average percentage change in productivity level (annual)</i> | | |
|----------------|----------------------|---------------|---|----------------|--------------|
| | | | <i>Labor</i> | <i>Capital</i> | <i>Total</i> |
| Brazil | Steel | 1966-1977 | 14.0 | 13.0 | - |
| Argentina | Electrical Machinery | 1960-1968 | - | - | 10.6 |
| Puerto Rico | Garments | 1951-1961 | 9.5 | - | n/a |
| Argentina | Metals | 1960-1968 | - | - | 9.3 |
| Argentina | Chemicals | 1960-1968 | - | - | 9.1 |
| India | Steel | 1914-1926 | 6.0 | -0.4 | n/a |
| Argentina | Machinery | 1960-1976 | 5.8 | - | 2.8 |
| Turkey | Electrical Machinery | 1963-1976 | - | - | 5.8 |
| Turkey | Apparel and footwear | 1963-1976 | - | - | 5.2 |
| Zambia | Mining | 1954-1966 | 4.9 | - | 2.7 |
| India | General Engineering | 1951-1959 | 4.1 | - | - |
| Argentina | Oil refining | 1960-1968 | - | - | 4.1 |
| Argentina | Textiles | 1960-1968 | - | - | 3.0 |
| Argentina | Rayon | 1941-1967 | 2.3 | - | - |
| India | Machinery (other) | 1960-1965 | 2.3/2.7 | -1.6/3.3 | 0.7/1.3 |
| Turkey | Basic metals | 1963-1976 | - | - | 2.2 |
| Turkey | Mineral products | 1963-1976 | - | - | 1.6 |
| India | Cotton spinning | 1961-1969 | 1.4 | - | - |
| India | Cotton weaving | 1961-1969 | 1.0 | - | - |
| Turkey | Textiles | 1963-1976 | - | - | 0.7 |
| Brazil | Machinery | 1938-1979 | 0.5 | - | 0.1 |
| Turkey | Food | 1963-1976 | - | - | 0.3 |
| India | Metal products | 1960-1965 | -0.8/-0.3 | 0.1/1.5 | -2.1/2.3 |
| Turkey | Chemicals | 1963-1976 | - | - | 0.0 |
| Turkey | Metal products | 1963-1976 | - | - | -0.1 |
| Turkey | Wood and cork | 1963-1976 | - | - | -3.3 |
| India | Iron and steel | 1913-1956 | -2.0 | - | - |
| India | Chemicals | 1960-1965 | -1.1/3.9 | -13.1/-0.1 | -2.0/6.0 |
| India | Electrical machinery | 1960-1965 | -2.8/0.9 | -12.0/9.2 | -3.1/4.3 |
| Tanzania | Cotton spinning | 1973-1979 | -9.6/-5.5 | -6.9/2.3 | - |

Table 2 – Average Change in Productivity Growth; Source: Bell et al. (1984)

While Table 2 obviously cannot supply complete conclusions on whether or not particular infant industries are successful, it does give an interesting overview on how certain industries fail to meet the productivity levels that are necessary to catch up with their foreign competitors. Moreover, productivity growth rates are one of the only tangible resources available that make assessment of existing infant industries possible and understandable.

6.2 The Case of Turkey

Turkey's protectionist behavior regarding certain infant industries was already represented in the previous paragraph by the presence of various firms in Table 2. Between 1963 and 1976 Turkey has granted protection to its domestic industries by classifying these industries as infant. Krueger and Tuncer (1982) develop an empirical model that is ought to assess the performance of infant industries under protection. Measurement of performance is similar to the theory presented in the previous paragraph and is based on the amount of input units needed to produce a certain level of output. This implies that a protected firm's units of input per unit of output should fall more (or rise less) than other, non-protected firms (Krueger, Tuncer, 1982).

Table 3 shows the results of Krueger and Tuncer's empirical model when applied to Turkey's protected industries. The effective rate of protection (ERP) and domestic resource costs (DRC) are taken into account to identify whether industries with a higher level of protection also benefit higher growth rates of output per unit of input. Two estimates of effective rates of protection can be found. While both ERP1 and ERP2 measure the effective rates of protection between 1963 and 1976, ERP1 includes both firms that already existed beforehand and includes startups in that period, ERP2 only covers firms that were active throughout the entire period (Krueger, Tuncer, 1982). Lastly, domestic resource costs are taken into account since measures of protectionism often imply that imported inputs should often be substituted by domestically produced inputs. While these three measures of effective protection are not always in consensus, they should give an idea on how heavily an industry is protected during the 1963-1976 period. As can be seen in Table 3, the Turkish industries are ranked in order of effective

rates of protection. The first couple of industries are closer to Turkey’s comparative advantage and hardly protected, while the latter firms are infant industries which benefit from significant protective measures.

| <i>Industry</i> | ERP1 | ERP2 | DRC | <i>Growth rate of Output/Input</i> | |
|------------------------------|------|------|-----|------------------------------------|----------|
| | | | | Firm Sample | Industry |
| Food products | 13 | n/a | 18 | 0.25 | 0.16 |
| Fur and leather products | 14 | -24 | -15 | n/a | -1.17 |
| Wood and cork products | 16 | 58 | -13 | -3.34 | -0.55 |
| Furniture and fixtures | 16 | n/a | n/a | n/a | -0.56 |
| Nonmetallic mineral products | 23 | -27 | 1 | 1.61 | 0.72 |
| Textiles | 42 | -23 | 12 | 0.72 | 0.84 |
| Apparel and footwear | 42 | 47 | n/a | 5.24 | 4.1 |
| Metal products | 57 | 140 | 682 | -0.05 | 1.61 |
| Chemicals | 60 | 200 | 21 | -0.04 | 0.46 |
| Electrical machinery | 63 | 113 | 36 | 5.76 | 1.41 |
| Paper and products | 72 | 105 | 97 | n/a | 1.55 |
| Rubber products | 77 | n/a | 279 | n/a | 4.27 |
| Basic metals | 80 | 113 | 14 | 2.21 | -0.93 |
| Nonelectric machinery | 142 | 132 | 36 | n/a | 0.62 |
| Petroleum refining | n/a | 236 | n/a | n/a | -8.8 |
| Transport equipment | 209 | 134 | 131 | n/a | 0.94 |
| All manufacturing | | | | 1.91 | 1.84 |

Table 3 – Effective Rates of Protection and Productivity; Source: Krueger and Tuncer (1982)

The last two columns represent the growth rate of output per unit of input for both the sample conducted by Krueger and Tuncer and the industry-wide rates presented by the Turkish state. One of the conclusions that follows after studying Table 3, is that a higher rate of effective protection does not necessarily lead to a superior growth of output per unit of input than the more traditional, unprotected industries. While the test of Krueger and Tuncer is simple, its reasoning is rather clear-cut and subsequent results do not indicate that protection of these infant industries was warranted (e.g. when comparing the results of the medium-protected textile industry with the results of the heavily protected petroleum industry).

While in this chapter two simple tests have been presented which can assess the performance of infant industries, neither are complete or can be used exclusively. However, both theories do give a tangible indication on the productivity of protected

firms relative to other players in the domestic- or international market. This can be a useful tool for policymakers when looking at the possibilities of protecting infant firms or for governments wanting to quantify some results of their protected industries.

7. Current Validity

As shown in this paper, the discussion that deals with protection of infant industries has covered more than two centuries. Over the years, the infant industry argument has been widely criticized by free trade economists while simultaneously being supported by List and Hammilton's followers. Various alternations have been made over time to make the argument more efficient, and therefore more valid. At present there are still a number of countries that could potentially benefit from infant industry protection (if possible) and it is therefore interesting to take a short look at the current status of the validity of the argument.

When criticizing infant industry protection, many economists refer to the failures of import substitution implemented by LDC's over the past decades. However, frequently critics fail to mention that these unsuccessful attempts are often a case of country-wide protection, rather than industry specific protection as the infant industry argument suggests. Moreover, some developing countries have implemented trade constraints merely due to Balance of Payments issues, which is introduced as the underlying rationale to protect certain industries. In contrast, relatively recent research (Reinert, 2000) has indicated the East-Asian tigers as a successful example of infant industry protection.

Apart from the fact that one should learn from mistakes that are made by other nations, such as countries in Latin America, research should also be done on international laws set by institutions that generally advocate free trade. A decision to protect an infant industry in 2011 is not solely dependent on the wishes of a domestic government. While the World Trade Organization generally promotes free trade, in some cases room is left for intervention when meeting specific criteria (Amsden, 2000). However, Shafaeddin (2000) argues that law restrictions should not be a constraint when deciding whether infant industry intervention is optimal or not. Shafaeddin believes that the existence of

rules is not an argument against protectionism and a reasonable trading system should not generalize the needs of individual countries.

Ever increasing globalization has caused some economists to doubt the current validity of the argument of comparative advantage as a first-best trade policy. Due to the free mobility of capital in the present world, an important pillar of the Ricardian theory is undermined (immobility of capital). The fact that capital is free to move to the place that gives investors the highest immediate return, implies that production will move to a location that has an absolute-, rather than a comparative advantage.

Another interesting point, raised by Reinert (2005), is that infant industry protection in various forms is currently still present in countries that are large advocates of free trade. An example is given in the form of subsidies given to small, start-up firms in the United States, ironically one of the biggest proponents of free trade theory. More specifically, the USA actively subsidizes firms active in the manufacturing industry to become more efficient and eventually reaching a better level of (international) competitiveness (Reinert, 2005). While this is not a classic interpretation of the infant industry argument, it does closely match some of its main characteristics and shows an interesting policy paradox of a nation that normally prides itself on its implementation of free trade in the modern world.

Whilst discussing the validity of the argument in a current economic environment, some might wonder what the effects are of the financial crisis of 2008. The crisis obviously has an enormous impact on the current world economy and it has led to various developed- and developing nations to increase protectionism in order to help out domestic industries. However, it does not generate any more reasons that warrant protection of infant industries, due to the fact that the credit crisis itself does not make an industry any more or less mature.

After centuries of discussion economists still do not agree on the question of whether or not to intervene to protect infant industries. The literature and evidence shown in this paper do suggest that there could be a case for infant industry protection when a string of conditions and circumstances are met. These outcomes are not restricted to the past

but could also be looked at by current LDC's wanting to develop certain industries with the goal of improving national welfare. The current economic- and political climate does therefore not make the infant industry argument any more or less valid. However, it must be noted that the same applies to the difficulties, risks and failures presented earlier, making the infant industry discussion as relevant and complicated as it ever was.

8. Concluding Remarks

This paper has tried to give clarity to the infant industry discussion which has spanned over the last two centuries. List's original arguments are often misinterpreted or abused by policymakers who wish to justify protectionism. However, very specific conditions have to be met for a protected infant industry to become independent and mature, and examples of successful implementation of the infant industry argument are scarce.

Necessary factors such as dynamic learning externalities and learning rate are complex to predict, which can lead to selecting and protecting the wrong type of firms. Moreover, the fact that the debate has been highly theoretical creates extra complexity when measuring the performance of industries that are currently being protected. Success could be measured by taking a look at learning effects (increases in productivity) versus the effective rate of protection. However, this only underlines that achievements can only be measured after an extensive period of time.

A general agreement has been reached regarding the fact that subsidies are economically more efficient than import substitution measures. However, international restrictions or fiscal constraints are often the cause of choosing tariff protection as a second-best alternative. The existence of corruption, lobbying and a public political debate add to the complexity of infant industry intervention. Many free trade economists fear the incapability and lack of discipline of local governments when it comes to diminishing protection over time, making it a permanent instead of a temporary tool.

To sum up; it can be argued that the infant industry intervention can be warranted under very strict circumstances while meeting a string of conditions. Without the

presence of factors such as dynamic learning externalities, potential to mature and spillover effects; an infant firm operating under protection might never reach a level of international competitiveness and remain a burden on national welfare. Moreover, policymakers are often not able to assess these factors properly beforehand, which makes the decision on intervention extremely difficult and risky. However, the difficulty of implementation should not necessarily be a reason to deny developing countries their right to a more developed industrial sector.

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