

Inside the Black Box: Policies for Economic Growth

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Abstract

Growth in income per capita is or should be a central objective of economic policy. This paper explores how the economy generates economic growth and what is actually going on in an economy when it does so. It describes economic growth as a fine-grained path-dependent process driven by entrepreneurs and involving transformation of the productive structure and the generation of new knowledge and capabilities. It concludes that, while the market is essential for organising economic activity, government intervention is necessary for markets to work effectively, and especially for them to work effectively in generating economic growth. The question then becomes not whether but how the government should intervene. The paper explores the nature of possible government interventions. It concludes that both broad-based policies (often thought of as framework or regulatory policies) and fine-grained policies (often thought of as facilitative or industry policies) have their place and that there is scope for action on both to improve New Zealand's economic performance.

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Executive Summary

The key objective of economic policy is to achieve high and rising levels of material well-being – proxied by per capita real income. Per capita income growth results from an evolutionary process of economic development. Economic development is driven by entrepreneurs in business. They grope forward in a radically uncertain environment seeking out profit opportunities. In doing so, they develop profitable new and improved products (goods and services) and methods of producing and marketing them - i.e., they innovate.

Entrepreneurs are motivated by the intrinsic satisfaction innovation yields, by social approval and by material rewards. In particular, profit provides entrepreneurs with the incentive and means to focus on socially valuable innovation and so to add to real output. A succession of innovations leads to successive increases in output per capita – in other words, leads to economic growth. Thus innovation is essential to economic growth.

In a modern economy, producing even relatively simple products requires a complex web of knowledge, institutions, skills, networks and other capabilities for their production. These capabilities are highly differentiated and product specific, so that countries that look alike in their factor endowments actually produce different products.

When they innovate, entrepreneurs build off the existing complex web of interdependent capabilities, and in innovating, create new, somewhat different knowledge and capabilities. This in turn creates a new higher foundation of capabilities and knowledge, laying the foundation for more innovation and economic growth. As a result, economic development is systemic in nature and path dependent. It results in an evolutionary transformation of the product mix and the production structure.

There are two implications of this analysis. First, the highly differentiated nature of products and capabilities means that areas of comparative advantage will be highly differentiated. This means that even a tiny country like New Zealand can realistically aspire to retaining and developing a sustainable comparative advantage in a few areas.

Second, where a country has developed a comparative advantage, it is likely that it has developed a myriad of related, difficult to replicate, world-class capabilities and resources. It is also likely in future that it will develop new world-class capabilities in products adjacent to its current comparative advantage. These capabilities will be difficult for a country without a similar comparative advantage to replicate.

For New Zealand, this puts a particular focus on the food and fibre based industries, together with their related and supporting industries.

There is an extensive literature on the nature of capabilities that are important to economic growth. These are summarised in MED's productivity model (see Annex 3). Broadly, there are two sorts of capabilities – capabilities of individual economic

agents (such as skills) and capabilities that relate to the relationship between economic agents.

One key such capability is a well functioning market. The market mediates the process of economic development. It resolves the enormously complicated problem of aligning the activities of all the actors in the economy.

However, in a modern market economy, the market is neither natural nor perfect. Ongoing government action is necessary to create and sustain a market which fosters socially productive innovation. It should seek to give entrepreneurs the incentive to compete on those margins, and those margins alone, that are socially desirable. It also should seek to ensure that they have available to them the capabilities they need to innovate. At the same time, it should do so in a way that recognises the incentives and uncertainties it faces.

Thus the real question for the government is not whether to intervene, but where, how and in what circumstances to intervene.

In New Zealand, as in other developed economies, there is a complex web of government intervention aimed at making markets work effectively to promote high and rising levels of per capita incomes. The New Zealand economy is regarded as having institutional settings that are relatively conducive to promoting good economic growth. In addition, the government intervenes in a variety of ways for economic and non-economic reasons. The design of these interventions has the potential to impact for good or ill on the operation of markets, including in particular the market for innovation.

However, government action to maintain and improve the market raises the risk of rent-seeking (i.e., when an individual, organization or business seeks to make money by manipulating the economic and/or legal environment rather than by trade and production of wealth¹), either by those in government or by those who can influence the government.

Thus an assessment of whether and how to intervene in any particular case involves an assessment of the costs and benefits of intervening.

For broad-based economy-wide policies, like competition policy, there is often good evidence for designing policy, and the risks of rent-seeking can often be contained. While only small improvements in these policies are likely to be possible in New Zealand, their broad applicability means that they are likely to have substantial effects and are worth pursuing.

Fine-grained policies, such as much of industry policy, are more problematic, for two related but distinct reasons. First, often the only robust source of evidence to design policy is the industry itself, making rent seeking more of an issue. Second, both the design and implementation of such policies often need to be customised to the particular circumstances, which means that those doing the design and implementation need to have the competence required to understand both the reason for intervening and the relevant part of the economy. Such skills are rare, meaning that we have to be quite selective in adopting such policies.

However, because the multiple capabilities required for achieving new areas of comparative advantage will be highly specific, intervention at this more detailed level

is likely at times to be important for fostering growth. In addition, the need to engage with industry raises the scope for coordinated action which can yield gains that are otherwise unattainable.

In the end the decision on where and how to intervene must involve a judgement about the various benefits and costs involved. There are likely to be circumstances where it is beneficial to introduce fine-grained policies that cannot be justified on the basis of robust statistical evidence. At the same time, the information needs and rent-seeking opportunities associated with such intervention, and the skills need to implement them effectively, mean that a selective approach and careful policy and institutional design is essential if the benefits of such policies are to outweigh their costs.

Table of Contents

Abstract	i
Executive Summary	ii
Table of Contents	v
1. The Importance of Understanding Economic Growth	2
2. Economic Growth: Inside the Black Box	3
2.1. Introduction	3
2.2. Productivity, Innovation and Economic development	3
2.3. Radical Uncertainty	3
2.4. Innovation under Uncertainty: The Role of the Entrepreneur	4
2.5. Profits as the Engine of Growth.....	4
2.6. Innovation Builds on Innovation, Leading to Economic Growth.....	5
2.7. Different Countries Specialise in Different Things	6
2.8. Innovation in Product Space	7
2.9. Other Forms of Innovation.....	8
2.10. Application to New Zealand.....	8
2.11. The Nature of Capabilities.....	10
2.12. The Influence of Geography.....	11
2.13. Coordinating Entrepreneurial Effort: the Role of the Market.....	12
3. Implications for Economic Policy	15
3.1. Assessing the Need for Policy Change	15
3.2. Empirical studies	15
3.3. Theoretical Approaches	16
3.4. Government Failures.....	20
3.5. Costs and Benefits of Different Interventions	21
3.6. Designing Policy to Maximise Net Gains and Limit Risks.....	25
4. Summary	27
5. Conclusions	32
Annex 1: Economic Growth: the Objective of Economic Policy	33
Annex 2: Porter’s Approach: The Competitive Advantage of Nations	36
Annex 3: MED’s Productivity Model	37
References	38
Endnotes	42

Inside the Black Box: Policies for Economic Growth²

1. The Importance of Understanding Economic Growth

This paper assumes that the central objective of economic policy is to achieve and sustain high and increasing levels of material well being for New Zealanders³. The paper abstracts from a wide range of related issues, such as income distribution, to focus sharply on this material well-being objective⁴.

Increasing income per capita is a good proxy for increasing material well-being of New Zealanders. And increasing output per hour worked (labour productivity) is by far the most important way to achieve increased income per capita. Countries can become richer in the short term by increasing the proportion of their population that works, or encouraging those in the workforce to work longer hours or harder. But these approaches have clear limits, which New Zealand is approaching. Over the longer term, the only sustainable way to grow income per head is to increase the level of productivity.

To design policy in pursuit of material wellbeing, we need a clear understanding of what causes productivity growth. Achieving this is quite a challenge. Economic growth has been studied intensively for centuries, leading to a good understanding of some of the causes of economic growth, and of appropriate policies to promote it. However, there is much that remains uncertain (Easterly 2001). In particular, the “Washington Consensus”, which described the then broadly agreed policy prescription, has been undermined by dissatisfaction with the results of applying it, and more “first principles” approaches are being proposed instead (World Bank 2005 page xiii, Rodrik 2006, Rodrik forthcoming). The analysis here, which attempts to push the boundaries of what we know about the causes of productivity growth and how to promote it, will therefore be open to debate.

Despite this, to give analytically robust and falsifiable policy advice, we do need a view about the causes of economic growth and appropriate policy to promote it. This paper proceeds in two stages. The first stage outlines the way I think about economic growth and how it occurs. The second, more normative, stage assesses the implications of this understanding of economic growth for policy⁵.

2. Economic Growth: Inside the Black Box

2.1. Introduction

The New Zealand economy is a complex system, with various components of that system interconnected with each other and with the rest of the world. Productivity growth within this system takes place through transformation of what is produced and how it is produced and marketed. This process of transformation is driven by business entrepreneurs operating principally within companies. In turn, the entrepreneurs are influenced in what they do and how they do it by the natural and institutional environment in which they operate. The following sections examine each of these issues.

2.2. Productivity, Innovation and Economic development

Productivity growth is driven by *innovation*: that is, the discovery, creation and commercialisation of new and improved products (goods or services) that consumers value, the development of productive new markets for existing products, and the discovery and implementation of new and more effective ways of organising production, distribution and marketing.

The following pages expand on this contention. It has two key components.

First, innovation is the creation of something *new* – it involves doing something that has not been done before. This innovation may be new to the world, new to the country or new to the business. Innovation leads to the creation of new or upgraded goods and services, business models, methods of production⁶, methods of distribution and markets. The upshot is that after an innovation is introduced, the economic structure is different in some way. Importantly, the knowledge base is also different – what the world knows after the innovation is different from and greater than what it knew before.

The second critical component of innovation is that the new thing created is *valued* by consumers in some way. Either it provides them with something new or different that they are prepared to pay for, or it provides them with something they already value more effectively or at lower cost.

2.3. Radical Uncertainty

The process of innovation takes place in a radically uncertain environment. Since innovation means doing something that has never been done before, there is an element of genuine uncertainty in all innovative activity. This is about Knightian uncertainty, not risk. The outcome of any attempt to create new value, like the future itself, is unknown and unknowable (Frederic Sautet in Procter, Carlaw, Easton, Grimes, Mare and Sautet 2008).

2.4. Innovation under Uncertainty: The Role of the Entrepreneur

Entrepreneurs and businesses⁷ are central to innovation. They seek to understand and anticipate (and in some cases create) market demands, and to develop new and better ways of meeting them. They operate in a radically uncertain environment. Entrepreneurs grope forward into this radically uncertain environment in a purposeful, profit-seeking manner (Lipsey, Carlaw and Bekar 2005, page 30)⁸.

There is a large literature exploring what motivates entrepreneurs. It appears that humans innovate both because it yields intrinsic satisfaction and because it leads to material rewards. Evolutionary psychology suggests that there may be an evolutionary basis to both of these motivations. Potential profits therefore provide a key motivation and guiding light⁹. Importantly for New Zealand, the payoff to entrepreneurship also includes social approval. The culture of a society – who people look up to and what they respect affects what entrepreneurs strive for and therefore where they allocate their entrepreneurial effort (Baumol 1990).

In this context, the distinction between risk and uncertainty is critical. Objective optimisation is impossible, since we have no well-founded probability distribution over which to optimise and in fact do not even know all the feasible eventualities to optimise over. Different individuals, faced with exactly the same information set, may legitimately have quite different probability distributions about the likely consequences of any proposed action, and so reach quite different judgements on the best way forward. There is no way of determining until the future unfolds whether either view or any other view is correct. In contrast, in almost all neoclassical models, "...two individuals, faced with the same endowments and tastes, faced with the same choice between two alternative courses of action and possessing the same set of relevant information, *are predicted to make the same maximising choice*" (ibid).

While this means there is no objective way of predicting the future¹⁰, the entrepreneur can (and must) form a view of the future, because experience shows that the future is likely to be in important respects similar to the past. So entrepreneurship involves a selective mapping of the past into the future (Loasby 2004, page 4).

2.5. Profits as the Engine of Growth

Because profits result from creating better or cheaper products that consumers value, the search for profits ensures that entrepreneurs and businesses seek out innovations that are socially beneficial¹¹. Even if an entrepreneur is not primarily motivated by profit, the generation of profits is necessary to generate the resources necessary to allow the entrepreneur's business to expand. In other words, profits also provide the engine for growth, by providing the funding that can be used for expansion of the businesses that are best at meeting consumer needs, and by starving those that are poor at doing so.

If the entrepreneur innovates successfully, they create value in the form of increased profits, wages or consumer benefits. These benefits arise because the product is produced more cheaply or because consumers are prepared to pay more for the new product than they were paying for the product that was previously produced with the

same inputs. In other words, there has been an increase in the value of real output per hour worked – that is, an increase in productivity¹².

2.6. Innovation Builds on Innovation, Leading to Economic Growth

As is noted above, innovation creates new knowledge. This new knowledge provides a foundation for yet more innovation.

Typically, products are introduced in a relatively crude form and are used in relatively crude ways. Over time through a combination of experiment, intelligent design and accident, how the product is used, made, distributed and marketed evolves to become increasingly sophisticated over time.

Hwang provides circumstantial evidence for this evolutionary process by showing that the unit value of a new-to-country export product starts off low but increases to the world frontier over time (Hwang 2006).

Using case studies, Lipsey *et al* 2005 (page 99) provide evidence for this evolutionary process in the discovery and implementation of general purpose product and process technologies (GPTs). GPTs are technologies that start off with one use, but end up with many uses across many sectors. While the authors focus on GPTs, it is likely that their findings apply to a greater or lesser extent to all other types of innovations.

The development of GPTs follows a tree-like structure (*ibid*, page 379) with the GPT spawning successive products which themselves follow a similar development path. The productivity of the technology, how widely it is used and the new investments that it spawns all typically follow a logistic curve, starting slowly and then building less slowly before eventually tailing off.

For example, electricity was originally studied because natural philosophers wanted to understand its nature¹³. With the invention of the voltaic cell in 1800, it became useful in a limited range of applications, the most important of which was the telegraph. In 1867, following a mix of discoveries and invention, the dynamo was introduced. After some experimentation between the use of direct current and alternating current, experience led to the displacement of direct current by alternating current for distributed generation because the latter was easier to transmit over distances. The use of electricity spread to street lighting and street cars. Eventually, electric motors came to replace steam engines in factories. This freed factories from relying on one central source of power, and allowed experimentation both in the layout and size of factories. Later still, motorised household appliances and computers were invented. The computer and computer chip were put to a myriad of uses including aeroplane controls, alarm clocks and the internet¹⁴.

As is noted above, a successful innovation creates a one-off increase in value. Some of the value accrues to the entrepreneur who created the innovation. Further benefits accrue to workers who produce the product (in the form of higher wages) and to the people who consume the product (in the form of more useful products or cheaper prices). And other benefits accrue to people who make use of the resulting new knowledge to create other innovations.

The more direct benefits of innovation arise because consumers are prepared to pay more for a new product than for a product that was previously produced with the same inputs. In other words, there has been an increase in the value of real output per hour worked - that is, an increase in productivity. For the same reason, the innovation's further dispersion and refinement, and the development of successful new products which make use of it, lead to further one-off increases in productivity and so income per capita.

A series of one-off profitable innovations therefore leads to a series of one-off increases in per capita incomes – i.e., leads to economic growth.

Thus economic growth results primarily from a succession of one-off innovations which are gradually refined and diffused over time.

Each innovation in turn improves the capabilities available to the economy, in terms of both knowledge and skills, and so provides the foundation for yet more innovation and growth.

The key point about innovation is that there need not be diminishing returns to capital investment in new technologies. A new innovation opens up a new way to use capital and labour. Provided the investment in successive innovations just recovers its cost of development, growth in output per capita can continue indefinitely (Lipsey *et al* 2005, Appendix to Chapter 4).

This is in contrast to continued capital investment in existing technologies with no further innovation, where continued per capita investment leads to diminishing marginal returns until new investment becomes unprofitable. As a result, with no further innovation, per capita investment and per capita income growth eventually stops.

Innovation is therefore the foundation of, and essential to, ongoing economic growth.

2.7. Different Countries Specialise in Different Things

The above discussion highlights the fact that economic growth is path dependent - what you produce today adds to the foundation of knowledge and other capabilities that you will build on to produce new things tomorrow. This path dependence can be seen in the different development paths of different economies.

The standard Ricardian theory of Comparative Advantage suggests that a country will specialise in production of those goods where it has a comparative advantage. In conventional Heckscher-Ohlin trade theory, a country has a comparative advantage where it has an abundance of a particular factor of production. Thus, for example, countries with an abundance of labour will tend to specialise in goods which require relatively more labour input to produce.

Closer examination reveals a picture that is richer and more interesting than this. As suggested by the theory of comparative advantage, countries will tend to specialise in areas indicated by their resource endowments. However, they will also tend to

produce products that are different from other countries with similar natural resource endowments. For example, Pakistan and Bangladesh, two countries that at face value have similar resource endowments, produce distinctively different products. Pakistan produces bed-sheets but few hats whereas Bangladesh does the opposite (Hausmann and Rodrik 2003, page 21).

The reason that otherwise similar countries produce different products is the path dependence discussed above. This in turn reflects differences in capabilities available to entrepreneurs within the different countries.

In order to invent and produce a new product or process, an entrepreneur must acquire or create the capabilities needed to produce it. This is no easy task, as even the simplest products in a modern economy require a myriad of different capabilities to produce. Hausmann and Rodrik 2006 (pages 9-10)¹⁵ illustrate the multiple capabilities required for production of new products by using the example of a relatively simple transaction – the sale and purchase of a house. They readily identify fifteen-odd separate but interrelated institutions that are needed for that transaction to happen. These include, for example, real estate agents, registries to record sales and charges over the property, and laws to enforce the contracts entered into. Given the coordination problems involved, these inter-related institutions are unlikely to develop other than in an evolutionary manner. Each will appear in a rudimentary form and evolve into more sophisticated forms in response to the evolution of the other capabilities.

The result is that (absent government support) it appears to be almost impossible for economies to produce products that require capabilities that are anything more than modestly different from their current capabilities.

An important and unsurprising corollary of this analysis is that rich countries produce different types of products from poor countries and they produce products in different ways that poor countries cannot easily imitate. That is the reason that the poor countries are not rich. Economic development is the (difficult) process of transforming the production structure from producing like a poor country towards producing like a rich country. The difficulty arises in part because of the complex interdependent nature of the capabilities required to produce rich country goods like a rich country (Hausmann, Hwang and Rodrik 2006).

In addition, because producing new products is difficult, poor countries that are already exporting goods that are typically produced by a rich country (so called “high income-content” products) tend to grow faster in future than countries that have relatively low income-content exports. China is one example of the former (Hausmann *et al* 2006).

2.8. Innovation in Product Space

We can get a clearer idea of how path dependent evolutionary development occurs in practice by drawing a picture of “product space”. This picture maps how “close” each product is to all other products. Closeness is measured by an outcome measure – one product is “close to” another product if a country that produces one also tends to produce the other. It likely therefore reflects differences in capabilities,

resource endowments and associated inputs to production (e.g., New Zealand has developed an expertise in stainless steel manufactures because they are used in the dairy industry).

Using this measure of closeness, Hildago *et al* find that any new product that a country exports tends to be “close to” products it already exports (Hildago, Klinger, Barabasi and Hausmann 2007). Thus for example over the period 1975 to 2000, Malaysia turned a foothold in the part of product space associated with electronics into a cluster of significant activity “close to” the original foothold (Hausmann and Rodrik 2006, page 17).

In addition, product space is not uniform. Countries with exports in parts of product space that are “close to” a relatively large number of other high value products therefore have an easier job in shifting into these other high-value products. Some countries, like China, India, Turkey, Poland and the Czech Republic, are in a very propitious part of product space, while other countries with the same income level are much less so (Hausmann and Klinger 2006).

2.9. Other Forms of Innovation

We do not have the quantitative data of this sort for other forms of innovation. However, by analogy, it seems likely that the product space analysis that is recorded above is just the “tip of the iceberg”, and that similar forms of innovation-driven evolutionary economic change take place along a wide range of other dimensions. For example, the above analysis is conducted at the SITC (Standard International Trade Classification) four digit level of aggregation. If we disaggregated further, we would expect to see a similar sort of evolutionary development. Likewise, if we could apply the same sort of analysis to business inputs, to non-traded goods, to services, to business models, to marketing and distribution methods, to organisational design and to business processes, we would expect to see economic development supported by existing capabilities and leading to new related but different capabilities. These in turn would continue to provide the basis for yet further innovation and transformation of the economy.

This hypothesis gets support from Lipsey *et al* 2005 (page 203 ff). They describe the development of a range of goods, services and organisational GPTs in a way that is consistent with an evolutionary process of development.

Thus comparative advantage and absolute advantage arises from the complex and very specific mix of capabilities – skills, knowledge, institutions and networks – that are available in an economy, as well as resources and factor endowments. In contrast to traditional Ricardian comparative advantage, most of these advantages are generated by the economy, rather than being due to its initial resource endowments. That is, they are man-made, not natural.

2.10. Application to New Zealand

There are three major lessons from this analysis for New Zealand.

First, the highly differentiated nature of products and capabilities means that areas of comparative advantage will be highly differentiated. This means that even a tiny country like New Zealand can realistically aspire to retaining and developing a sustainable comparative advantage in a few areas.

Second, where a country has a comparative advantage, it is likely that it has a myriad of interrelated, difficult to replicate, world class capabilities and resources¹⁶. It is also likely that the country will develop new world class capabilities in products adjacent to its current comparative advantage. These new capabilities will be difficult to replicate for a country that does not have an existing similar comparative advantage.

Third, because of this tendency, and because of the impact of clusters of activity on productivity (Cortright 2006), these niches are likely to be part of clusters of activity that are closely related both geographically and in terms of technologies or other capabilities.

In New Zealand's case, these lessons put a particular focus on the primary industries and the food and other manufacturing and service industries built off them. Importantly, given the capability-driven path-dependence outlined above, it also puts a focus on the related and supporting industries.

The importance of upgrading both within and from New Zealand's natural resource based industries is evident from some other rich countries that share in a general way New Zealand's characteristics, such as Finland, Sweden, Norway, Denmark, Iceland, the Netherlands, Canada, and Australia. Without exception, these countries are continuing to develop by leveraging their natural resource bases. Even in Sweden, Finland and the Netherlands, which have developed significant high tech sectors, these sectors have supplemented the low and medium tech specialisations, but have not replaced them. And the high tech specialisations they have created have often grown out of their natural resource based industries. Nokia, for example, started out as a forestry company. Likewise, many of Finland's most important companies are in related industries such as forestry processing machinery and equipment, marine engines, and so on.

All the above countries have grown mainly by the persistent upgrading of low tech and resource-based industries. One of the basic mechanisms in this has been the sustained development of both upstream and downstream linkages from the resource-based industries, leading to major cluster development. The heart of this upgrading and the spawning of related industries is knowledge based. Low tech sectors develop by drawing heavily on science and other knowledge created outside the industry and through innovation within it.

Like other small primary exporting countries, New Zealand is relatively rich in the resources needed to produce agricultural, pastoral, forest and seafood based produce. This undoubtedly was an important reason New Zealand initially developed a comparative advantage in food and fibre products. The history of the development of these industries in New Zealand appears to be well described by an upgrading of *inputs* to production identical in kind to the development of GPTs and product space as outlined above. New Zealand's pastoral industries have grown on the back of the application of science to inputs to these industries. In addition, there are instances

(such as Trutest, Gallaghers and NDA engineering) where new specialisations have grown out of related industries supporting the primary sector.

The lesson for New Zealand is that our food and fibre primary and manufacturing industries together with their related and supporting industries are and (with ongoing effort) will continue to be an ongoing foundation for development in New Zealand. The capabilities that New Zealand has developed in all parts of the value chain provide a foundation which New Zealand can use to build knowledge, skills and infrastructure and so future competitiveness (Smith 2006).

We have not yet been able to formalise the product space analysis for New Zealand. However, a perusal of the product space maps for New Zealand (Hildago *et al* 2007) suggests that many of our primary industries are in a relatively sparse, low-value, part of the product space. This suggests that developing new areas of comparative advantage from them will not be easy.

It will therefore be important to make the most of the specialisations that we already have begun to develop. This includes those that have grown out of the natural resource based industries, such as those discussed above. It also includes others where historical development has given us a nascent cluster of businesses with current comparative advantage – for example, health care products (e.g., Fisher and Paykel Healthcare), electronics (e.g., Tait Electronics), and boat-building.

On the other hand, for a country that specialises in exports of primary products, New Zealand exports relatively high income-content products. The income-content of New Zealand's exports is consistent with its income per capita (Hausmann *et al* 2006). So on this measure we seem to have done relatively well to date and have normal growth prospects.

2.11. The Nature of Capabilities

The previous discussion highlights the importance of country-specific capabilities to productivity growth. There is a huge literature that attempts to identify more specifically the nature of these capabilities. These capabilities, and the relationship between them, are summarised in MED's productivity model, attached as Annex 3. I will give a brief overview of the literature here. For a fuller discussion, see for example Temple 1999, Easterly 2001, Helpman 2004, and Weil 2005.

As the housing market example given above implies, the capabilities needed in a modern market economy are myriad, highly-differentiated, interconnected and co-evolving.

In broad terms, there are two types of capabilities – capabilities that relate to individual economic agents, and capabilities that relate to the economy as a system. Underpinning them all are institutions - the "rules of the game", consisting of organisations, the formal legal rules, the informal social norms and their enforcement characteristics that govern individual behaviour and structure social interactions (institutional frameworks). Institutions are fundamental to making growth possible (Acemoglu, Johnson and Robinson 2002, discussed in Helpman 2004, chapter 7) ¹⁷.

Individual economic agents can be people, businesses, governments, government agencies and other organisations such as universities and NGOs. Capabilities that relate to individual economic agents are either embodied in them or owned by them. For people, for example, one key embodied capability is human capital – skills, intelligence, codifiable and tacit knowledge, and emotional intelligence. Owned capabilities include things like land and other forms of capital, resources etc that agents have at their disposal.

Importantly, many of the capabilities are systemic – they influence how easily agents can relate to each other, how easily they can learn about other parts of the system, and how easily they can discover and access the capabilities they need.

A key way that individual agents relate is through the market. Because of its importance, this is discussed separately below.

Other systemic capabilities include social capital (which influences how easy it is for individuals to connect through the market and in other ways) and culture (which can influence how entrepreneurial people are).

Interconnections between economic agents have been studied from a variety of perspectives. Examining agents and the inter-connections between them from the perspective of cities (Crawford 2006) and clusters of economic activity (Cortright 2006), show that both boost economic activity in a variety of ways. They allow better matching, greater specialisation and increased knowledge spillovers.

The national innovation system approach (OECD 2007) examines the role of economic agents and the interconnections between them from the perspective of innovation. This shows that interconnections are critical to innovation because innovation is not a linear or individualistic process. It arises from the ongoing interplay of actors within the economy (and the wider world) and is systemic in nature (Smith 2006). It is driven by entrepreneurs operating in the market and is supported by strong links between businesses and markets, other businesses, universities and the science base. As a result, for example, businesses that collaborate with other businesses tend to be more innovative (Department of Industry Tourism and Resources 2006).

This and other literature emphasises the importance and difficulty of transmission of knowledge between economic agents. Facilitating knowledge transfer is therefore a key challenge for policy.

For New Zealand, a key influence on interconnections, the knowledge flows that they facilitate, and hence innovation performance is geography. The next section explores this.

2.12. The Influence of Geography

New Zealand's geography makes it an outlier compared to other small developed countries. New Zealand is a small country far distant from world centres of innovation and markets. It is also sparsely populated.

All these characteristics impact on innovation. Sparse population means that markets are relatively thin, limiting specialisation, limiting knowledge spillovers within the national innovation system and making it difficult to get the good matching of supply and demand that results from thick labour and product markets. This emphasises the need to coordinate the components of the innovation system to maximise linkages, and to make best use of those areas of agglomeration that we do have - notably, Auckland (McCann 2003).

Distance also matters. Work by the OECD (OECD 2008) suggests that up to 10 percentage points of New Zealand's productivity gap with the rest of the world can be accounted for by size and distance. There are a number of reasons for this.

First, by far the majority of world innovation takes place offshore. We can therefore only expect New Zealand to lead the world in innovation in a few areas, e.g. parts of the food and fibre industries, and some niche manufacturing and services. Thus economic growth is mainly about absorbing innovation from overseas, rather than creating new-to-world innovation. To understand and absorb relevant knowledge, businesses need expertise in the corresponding areas (Helpman 2004, chapter 5). Universities and research organisations also benefit from linkages and collaboration with other research institutions, both here and overseas (North 2005 page 84-85). But knowledge flows fall off with distance. New Zealand is particularly challenged in this regard, because it is both small and distant from world markets.

Thus distance from market makes it difficult for us to learn about innovation from offshore. It also makes it harder for business to learn about and react to overseas market demands.

Trade also falls with distance. (See for example Battersby 2003). New Zealand has a very low trade/GDP ratio for its size (Ministry of Economic Development, The Treasury and Statistics New Zealand 2007). Because much innovation is embodied in goods and services, a low level of trade makes it more difficult to import embodied technology. In turn, this reduces flows of knowledge about new technological developments.

Thus, international linkages (via interpersonal connections, via imports and exports, and via inward and outward direct investment) are critical for allowing information to flow on new innovations, new technologies, new business models, new processes and market demand conditions. Given New Zealand's natural geographic disadvantages, the economy has to do better in other areas to compensate.

2.13. Coordinating Entrepreneurial Effort: the Role of the Market

The economy is a complicated system, in which the actions of each player impact directly or indirectly on many other players. Within this system, potential profits¹⁸ guide entrepreneurs towards innovations that consumers and other producers value. In innovating, entrepreneurs use the market, along with more informal networks, to access and combine the multiple capabilities that are necessary to produce each new product.

By motivating entrepreneurs to develop and market products that consumers value, the market resolves the enormously complicated problem of simultaneously working out what consumers value and what producers should produce to meet those consumer wants, in a way that tends to:

- direct resources towards particularly valued uses;
- reward entrepreneurs for their success in innovation;
- compensate each producer for the effort and other resources they need to expend in production; and
- provide consumers with what they want.

“The market system will [tend to] integrate the innumerable pieces of information [currently] scattered amongst individuals and will achieve a degree of social integration that would resemble what could have been attained by a single mind that possesses all knowledge” (Sautet 2000). At the same time, it will generate new information that leads to different behaviours in future.

The effectiveness of the market in coordinating this myriad of transactions is remarkable. However, it is not something that can be taken for granted. In a modern economy, it is neither natural nor perfect. Markets may and historically did start to develop through private action. However, in their modern form they evolve within a framework created by governments.

MacMillan points out that “The ‘hand’ that guides the market... is a human invention with human imperfections. It does not necessarily work well.... It works through institutions, procedures, rules, and customs”. McMillan draws the analogy between an unregulated market and a game of football without a referee or rules. “An absolutely free market is like ... a free-for-all brawl. A real market is like American football, an ordered brawl” (McMillan 2002 page 8,12). The analogy is an apt one. Players in a modern football game compete within the limits of the laws of the game, and some try to compete outside the rules. Sometimes they succeed, and sometimes they are caught and punished.

Baumol 1990 examines the historical record of entrepreneurship in promoting economic growth. He demonstrates that all societies have entrepreneurs, but that the contribution of a society’s entrepreneurial activities to economic growth varies largely because of their allocation between productive activities such as innovation and largely unproductive activities such as rent seeking or organised crime. This allocation is heavily influenced by the relative payoffs society offers such activities. These payoffs may include prestige as well as material payoffs. Thus for example, the Romans invented the steam engine, but because the incentives did not favour its commercialisation, it did not lead to productivity gains. In New Zealand it appears that small investors see investment in real estate as less risky, more bankable, and more rewarding than alternative investments that may contribute more to future economic growth.

Similarly, North 2005 suggests that markets must be structured to provide incentives for the players to compete at those margins, and those margins alone, that induce growing productivity growth. The market is underpinned by institutions – organisations, formal rules, informal norms and their enforcement characteristics. A country’s ability to undertake economic development depends largely on society’s ability to create institutions that are productive, fair, stable and broadly accepted –

and, importantly, flexible enough to be changed in response to economic and political feedback. “The growth of knowledge is dependent on complementary institutions which will facilitate and encourage such growth, and there is nothing automatic about such development”. “The institutional structure is a human made creation whose functioning is neither automatic nor natural. Moreover the structures must be continually altered with changes in the basic parameters of technology, information and human capital....The best recipe ... is the maintenance of institutions that permit trial and error experiments to occur”.

North goes on to suggest that *ongoing* government intervention is therefore required to make markets work more or less effectively. This needs to extend beyond “efficient” property rights and the rule of law. “...Factor markets [must] be structured ... to get players to compete via price or quality (rather than by killing each other or engaging in other anti-social activities).” Importantly, they also need to evolve over time. “This problem is complex, because successful adaptation to changing conditions entails altering economic institutions, which frequently involves the enactment through the polity of new rules” (North 2005, pages 84- 85, 99, 162-163, 122-124).

Thus, the simplistic dialogue about whether the government should intervene or not, or whether it should deregulate, misses the point. It must intervene, and it must continue to adjust its interventions in the light of evolving market conditions. As a consequence, a typical market economy has a complex web of government provided products (such as education and long time horizon research) and other interventions (such as criminal law and consumer protection law) designed to support effective economic and social interaction.

This does not mean that the government substitutes for the role of the market in allocating goods and services or in setting prices. The market has proved the most effective means of coordinating entrepreneurial effort and creating innovation. However, it does mean that there is a role for the government in influencing the context within which markets work.

3. Implications for Economic Policy

3.1. Assessing the Need for Policy Change

The New Zealand economy, like any modern economy has in place a complex web of government interventions – taxes, publicly provided goods, regulations governing social and economic behaviour, enforcement mechanisms, etc.

Much of the complex web is aimed at facilitating income growth. In addition, governments intervene for a variety of other economic and non-economic reasons. The New Zealand government for example has a heavy hand in health, education and welfare. And it has to finance these and other interventions through the tax system. The design of these interventions also has the potential to impact on growth.

Since economic growth is driven by entrepreneurs innovating, the touch-stone for policy should be identifying and remedying situations where socially valuable innovation is more difficult than it needs to be. In other words, the objective of intervention should be to facilitate innovation by enhancing the ability, connectedness or incentives of entrepreneurs to spot and pursue socially worthwhile outcomes and to discourage them from pursuing socially undesirable outcomes.

There are a number of ways that we can identify areas where changes in policy can potentially improve the functioning of markets in contributing to income and income growth. Two key ways are:

- a) Empirical studies identifying what capabilities are conducive to growth.
- b) Analysing from a more theoretical perspective how markets and the institutions underpinning them may fail to deliver good outcomes.

These two ways are not without their difficulties. Often, these difficulties can be reduced by using the two methods together. In particular, empirical work will inevitably not give us a full picture. We can use empirical work to provide some “stakes in the ground” in terms of creating a map of what is important for productivity growth, and then use theoretical reasoning to bridge the gap between the “stakes” to give a more comprehensive picture¹⁹.

3.2. Empirical studies

Empirical studies can be used to identify at a broad level the capabilities that are associated with high income levels and growth rates. While these studies are not without their difficulties, they have the virtue of directly assessing the impact of various interventions on material well-being.

These studies can be used to assess what capabilities are important for economic growth. The capabilities that this statistical evidence suggests are important are summarised under heading 2.11 above.

The main disadvantage of these studies is that they cannot give evidence on all important capabilities, including in particular on those capabilities that are only

observable at a low level of disaggregation (such as the need to have a register of real estate, as discussed in the real estate example above). This is an important omission, since (as the discussion above makes clear) many of the important capabilities will only be observable at this highly disaggregated level.

These empirical studies suggest that the New Zealand economy has institutional settings that are relatively conducive to promoting good economic growth (OECD 2003). It has a relatively stable and cohesive society. It has political structures that both allow institutions to be adapted and that are accountable to the public. It has an independent judiciary and a police force that largely acts within the rule of law. Corruption is low. The rule of law and property rights are well established, meaning that entrepreneurs can expect to be rewarded for successful innovation. Competition and consumer protection law tend to limit competition along undesirable margins and so foster competition along desirable margins. Markets are flexible, allowing entry of new businesses and exit of poorly performing businesses (McMillan 2004). And so on.

As a result, New Zealand markets are relatively effective at giving people the incentives, ability and capacity to pursue their own welfare and in doing so undertake socially worthwhile activities.

However, as the analysis above makes clear, just because markets are effective at any point in time does not mean that the institutions underpinning them do not need adjustment over time as the environment changes and knowledge improves. In addition, although the institutions are good, it does not mean they are as good as they can be. Studies comparing New Zealand with other countries suggest that many other OECD countries do better than New Zealand on some important dimensions (see for example Ministry of Economic Development *et al* 2007, especially page 7).

Empirical studies can also be used to assess whether interventions undertaken for other reasons are having an adverse and unnecessary impact on incomes. The design of these interventions has the potential to impact for good or ill on the operation of markets including entrepreneurial activity within them. For example, the method of remunerating tertiary education staff leads to a bias in staff quality away from market-relevant disciplines (Boyle 2007). Similarly, the New Zealand tax system has a relatively heavy bias towards capital income taxes (Ministry of Economic Development *et al* 2007, page 85). While these biases may be justified on other grounds, they are likely to be less than helpful for growth.

3.3. Theoretical Approaches

The second way of assessing the effectiveness of markets and the need for policy change to improve economic growth is to adopt a theoretical approach. For example, using neo-classical reasoning about market failures can be helpful, provided it is done judiciously. In particular, four cautions are warranted:

First, not all neo-classical market failures are bad for innovation. Market imperfections are necessary to foster innovation (Lipsey *et al* 2005, page 45-46). For example, economic rents²⁰ are necessary to encourage innovation, and innovation

may be fostered by head-to-head competition between oligopolistic rivals (Aghion, Bloom, Blundell, Griffith and Howitt 2005). We therefore need to make an explicit judgement about whether a particular market failure is likely to foster or inhibit innovation.

Second, neo-classical economics tends to abstract from many important capabilities, and therefore potential deficiencies in those capabilities. We need to explicitly address those capabilities in using neoclassical reasoning to identify policies to enhance economic performance. In particular it tends to underplay the difficulty of acquiring information that already exists and of interconnections between agents²¹. For example, social capital is important in establishing trust and so facilitating low cost contracting

Third, we still need to apply judgement about what is “good” innovation (e.g., we probably don’t want the market for stolen goods to work better, and we probably don’t want businesses to innovate by finding more sophisticated ways of misleading consumers).

Finally, the analysis will not typically identify how important the failure that is discovered is to growth.

Nevertheless, it is likely to be a useful basis for assessing whether the functioning of markets and government interventions can be improved, especially where empirical evidence is not available.

The (interrelated) characteristics of markets that may lead to poor outcomes – market failures²² - include:

1. Uncertainty
2. Incentives
3. Spillovers
4. Path Dependence
5. Information Asymmetries/ Missing Markets
6. Coordination Failures
7. Non-rationality

These are discussed in more detail over the next few pages.

3.3.1. Uncertainty

The earlier discussion highlighted the fundamental problem that entrepreneurs face in dealing with uncertainty. While much of this is unavoidable, reducing the extent of uncertainty that entrepreneurs face allows them to focus their attention on dealing with the unavoidable uncertainties at the heart of innovation. Certainty, clarity and trust (important for ease of contracting) can be improved by establishing:

- efficient property rights and speedy and impartial enforcement of contracts.
- a stable macroeconomic environment to ensure that the most important and pervasive prices in the economy reflect fundamental value, and not, for example, short term business cycle fluctuations. Most OECD countries, including New Zealand, generally perform well on this score. However, for New Zealand, exchange rate volatility is a significant issue.
- an intuitive²³, predictable and relatively stable regulatory environment.

- a predictable approach to changes in regulation.

3.3.2. Incentives

Regulation and other institutions are essential to ensure that it is easy and profitable for entrepreneurs to “compete at those margins, and those margins alone, that induce growing productivity”, and hard to compete at the myriad remaining margins. Entrepreneurs’ guiding light is profit, and they will compete and innovate along whatever margins are profitable, whether those margins are socially beneficial or socially destructive. “[If] the incentives reward piracy, then that will be the outcome” (North 2005, page 77, 84).

There are a wide range of policies aimed at ensuring innovation takes place along socially productive margins. For example, law, regulation and other institutions can help people and businesses overcome information problems and help prevent the creation of information asymmetries for welfare-reducing commercial gain. Examples include laws on corporate governance and consumer protection (Gans 2005, North 2005 page 76).

Beyond ensuring that only socially beneficial innovation is profitable, regulation can help ensure that entrepreneurs and businesses are *actively* encouraged to innovate along those margins that are socially beneficial. In particular, strong competition law, including law that promotes head-to-head competition between oligopolistic rivals, promotes innovation (Aghion *et al* 2005, Baumol 2002).

3.3.3. Internalising Spillovers

While a business profits from its contribution to successful innovation, it typically does not reap the full benefits of its discovery. As is discussed above, a new innovation creates new knowledge and the other capabilities needed to exploit it, which provides: (i) a higher platform for further refinement and diffusion; (ii) a platform for further discoveries; and (iii) a stepping stone to new, higher-value products and processes. The future result of this process in many cases will be unimaginable when the innovation is introduced. This applies to the many forms of knowledge generation, including innovation in production, processes, organisational form, marketing and distribution.

For example, as is discussed above, the discovery of electricity in the 18th century has allowed a large number of further inventions that have literally transformed the way that our societies function. Similarly, the development of the production line, often attributed to Henry Ford²⁴, eventually transformed the process of manufacturing.

Likewise, when a business starts successfully producing a new product or exporting to a new market, it shows that the country has the capabilities and cost structure necessary to compete in those markets. This generates information that is valuable both to competitors and to other businesses producing similar products (Hausmann and Rodrik 2002). For example, in New Zealand, the people who first discovered that wine could be profitably exported provided valuable commercial information to all others who later set up their own vineyards and wineries.

In implementing innovations like these, each business also provides a training ground for its employees to learn the capabilities necessary to implement the innovation, which it may not capture if the employees leave to set up or join a competing business.

Thus, innovation typically results in new products, processes and capabilities that provide substantial benefits to society over and above the profits to the business – i.e., substantial spillovers. This provides a potential justification for government support for such innovation.

3.3.4. Path Dependence

As is noted in section 2.8 above, moving towards some part of product space rather than others is more valuable in terms of the number of new high value (in particular, nearby high income-content export) production opportunities that it opens up. So some development paths are more propitious than others in terms of the opportunities that they open up for future growth.

Sometimes, it will be commercially beneficial for businesses to pursue the most propitious path, but this will not always be the case. This is because each entrepreneur is interested only in the opportunities they generate for themselves, whereas society and the government are interested in the opportunities available to the economy as a whole and so all New Zealand entrepreneurs in the future.

There is therefore a potential case for the government to influence the economy towards parts of product space with better future growth potential, by encouraging some direction of development over others²⁵.

3.3.5. Information Asymmetries/ Missing Markets

As Stiglitz 2002 (page 478) has pointed out, information asymmetries mean that “market failures are pervasive”. Information asymmetries also mean that markets cannot always be relied on to produce good outcomes on their own.

Because innovation is about the creation of new knowledge, a particular form of information, information asymmetries are particularly important for innovation. There are likely to be missing markets, and the institutions that evolve to substitute for the missing markets may not improve matters. For example, information asymmetries can limit the development of capital markets. Financial markets to fund human capital development and start-ups, where collateral is limited, are likely to be weak (Stiglitz 2005, pages 25-27).

3.3.6. Coordination Failures

As is clear from the above, innovation involves the coordination of many different capabilities. While it will often be viable to undertake that coordination as a commercial venture, there will be other instances where it will not. For example, there may be such free rider problems that it is too difficult to coordinate activity, or once activity is coordinated, too difficult to extract sufficient commercial gain. In this case, government intervention can help²⁶.

3.3.7. Non-rationality

The assumption that individuals will act in their own best interests is only approximately true. There is clear evidence from the field of behavioural economics that there are systematic biases and “imperfections” in individual behaviour (NEF 2005). There is also evidence that these biases are exploited by businesses (Cialdini 2001).

Even if this were not true, the complexity of the world means that individuals build mental models of the world and they behave as if that model were reality. Over time, societies build cultures which form a background to and influence individual decisions. Both individual beliefs and cultures may not reflect reality, meaning that innovation may not be constrained by reality, but by people’s perceptions of it (North 2005, for example page 117).

3.4. Government Failures

As is noted above, ongoing active government intervention is inevitable in any modern economy, and certainly in an economy like New Zealand. Sections 3.1 to 3.3 suggest areas where changes to government interventions might yield benefits to innovation.

3.4.1. Rent Seeking

An important corollary of the need for ongoing government intervention is that a government strong enough to impose rule changes is essential. The paradox is that such a government is also strong enough to prey on the market for the ends of those who control the government.

This raises two potential concerns. The first concern is that the polity or the bureaucracy may undertake interventions that pursue their own interests. The second (and related) concern is that business may see the government intervention as an opportunity to divert some of the government’s tax revenue or other resources to enhancing its bottom line (so-called rent seeking²⁷). If scarce entrepreneurial efforts are diverted towards innovation aimed at extracting rents, they are diverted away from socially productive innovation. Thus intervention that raises the risk of rent seeking can be damaging to economic growth. This is a major concern, and it is essential that policy be designed to limit the incentive for and potential scope of rent seeking. It is better not to implement a policy change than to implement one that chances encouraging a culture of rent seeking.

“The government is hardly a disinterested party. The structure of political markets will determine whose voices are “heard” in shaping additional rules governing each market.” Thus “...well functioning markets require government, but not just any government will do. There must be institutions that limit the government from preying on the market. Solving the development problem therefore requires the crafting of political institutions that provide the necessary underpinnings of public goods essential for a well-functioning economy and at the same time limit the discretion and

authority of government and of the individual actors within government” (North 2005, pg 124, 85).

3.4.2. Poor Targeting

Improving an intervention requires us to be able to identify it and its deficiencies with sufficient precision that it can be adequately addressed. This raises a key issue. Government policy makers have the same bounded rationality and face the same radically uncertain environment as entrepreneurs. In fact their difficulties are greater, since the government is further distant from market sources of information. As a result they can never be certain that they have correctly identified an area that needs policy attention or have correctly designed and targeted an intervention to address the problem. Likewise, those implementing the intervention face similar difficulties. Furthermore, there is no market test to sift out poorly designed or implemented interventions.

This is not an argument for not intervening, since there is no a priori reason to suppose that the existing set of interventions is in some way superior to any new or revised intervention. However, it is an argument for:

- Designing the policy so that it is robust to poor targeting or poor implementation, and that it allows adaptation to changing circumstances over time
- Ensuring that those designing the policy have sufficient competence and knowledge of the relevant part of the economy to understand the rationale for intervention and to design the policy to be appropriate to the circumstances.
- Ensuring that the policy is sufficiently simple to implement that the officials charged with implementing it have the capabilities to implement it appropriately (this may imply simple implementation or officials with a sophisticated understanding of the policy).
- Subjecting each intervention to robust formal evaluation²⁸.

There are questions about whether these conditions are always, or even normally, fulfilled with respect to industry policy in New Zealand.

3.5. Costs and Benefits of Different Interventions

Where and how to intervene must be decided on the facts of the specific situation. This requires an assessment of the costs and benefits from doing so. The costs include the resource costs of intervening, the costs the private sector faces in adjusting to the intervention and the costs of any rent seeking induced (directly or indirectly) by the intervention. The benefits arise from promoting innovation by better providing people with the ability, connectedness or incentives to spot and pursue socially worthwhile outcomes, as discussed in sections 3.1 to 3.3.

It is important that, wherever it can, the government adopts a transparently and soundly reasoned and evidence-based approach to intervening, for two reasons. First, it increases the chances that the policy is appropriately targeted. Second, provided the government takes – and develops a reputation for taking – such a reasoned and evidenced based approach, policies can be relatively robust to rent-seeking. Under these circumstances, lobbying efforts are likely to be

concentrated on adducing evidence about the impact of potential policy changes, an approach that is supportive of good policy.

3.5.1. Broad-Based Policies

For broad-based policies (policies have an impact across large parts of the economy)²⁹, we can often generate an evidence base using international statistical evidence such as cross country studies (for example, OECD 2004) to provide a foundation for appropriate policy. This allows us both to assess the nature of the appropriate intervention and its probable impact. In addition, we can normally design the policy so that its ongoing implementation (after the initial design and implementation) can be safely delegated to people who do not need to understand the reasons for the policy. (For example, those assessing whether some expenditure qualifies for a R&D tax credit need to know only the relevant legislation, not why the legislation was implemented).

Because broad based policies have an impact across large parts of the economy, even small changes to them offers the potential for substantial gains (and losses). New Zealand has broad-based policies that approach international best practice (OECD 2003). Nevertheless, there are still opportunities for further measures along these lines. For example, the recent introduction of the R&D tax credit, should, on the evidence available, lead to further gains in economic growth (Davis 2006). The Economic Development Indicators Report 2007 (Ministry of Economic Development *et al* 2007, especially the summary on page 7) highlights a range of interconnected areas where New Zealand's economic performance is mediocre by OECD standards. While these do not necessarily indicate that further intervention is required, they are deserving of further consideration. For example, the Report points to weaknesses in New Zealand's capital markets³⁰.

Thus the potential net gains from further evidence-based improvement of broad-based policies are substantial and they should continue to be pursued.

3.5.2. Fine-Grained Policies

The description of innovation and growth in the first half of this paper makes clear that many growth opportunities will actually occur at a lower level of disaggregation than can normally be assessed by statistical data. Many of the capabilities that might be needed to take advantage of these potential growth opportunities can similarly only be assessed at this lower level of disaggregation. This can be illustrated by the example of the housing market discussed earlier. Some of the capabilities cited are provided by the private sector (e.g., real estate agents) and some are provided by the government (for example, the registration of title and of charges against the title).

Since business will have the incentive to provide any capabilities that are required, the binding constraint to innovation is likely to be capability requirements that require government action. Fine grained policies³¹ to address them, if they can be implemented effectively, are therefore potentially important in promoting growth. This suggests that the government should seek to find a practical way of intervening at this level.

Typically, independent empirical information is not available about such opportunities. In order for the government to identify those products and whether it is socially beneficial to provide them, it must gain a detailed knowledge of the sector, knowledge that can likely only be obtained directly from the sector involved³². This requires a process of discovery, a process that necessarily involves engagement with the private sector actors involved. One way of engaging is to choose a unit for engagement that is likely to have some commonality in the capabilities it needs. This might be at the level of regions, sub-sectors, products, or even individual businesses (referred to from here on as “sectors”).

Hausmann and Rodrik express this need for engagement this way. “The government has only a vague idea at the outset about whether a set of activities is deserving of support or not, what instruments to use, and what kind of private sector behaviour to condition those instruments on.... An industrial policy that is cognisant of the government’s lack of omniscience has to be constructed as a system of discovery about all those sources of uncertainty. It requires mechanisms for eliciting information about the constraints markets faced, and hence close collaboration between the government and the private sector” (Rodrik 2007 page 38, Hausmann and Rodrik 2006).

This sectoral engagement opens up the additional possibility of coordinated action between the government and business, which (rent seeking aside) is likely to yield greater benefits than could be generated if both worked independently. Rodrik states that a strategic partnership between the government and industry will facilitate a process of self-discovery, with the aim of “learning where the binding constraints lie and on eliciting information on the private sector’s willingness to invest subject to the removal of those obstacles”. The objective is to engage in a genuine cooperative agreement where each party is undertaking the sorts of activities it normally undertakes, but in a way that shares information and coordinates actions (Rodrik 2007, page 40).

The potential benefits include the following:

- the government can adjust its funding of industry good research to complement commercial research being undertaken by businesses in the sector. In doing so it can encourage businesses both to do more research and to coordinate their research so that the benefits can be spread more widely.
- the government can adjust its funding of higher education (as the Irish and Finnish governments have done) so that students are encouraged to study the skills that are needed to support the direction of the country’s growth strategy or that businesses identify they need to expand.
- the government can alter regulation that is inappropriately interfering with the ability of a business to prosecute its strategy effectively.

In practice, the government already makes decisions that have fine grained effects - but often with the various decisions fragmented across parts of government and taken in an uncoordinated manner. Or it simply reacts to decisions of the private sector.

For example, decisions by ports regarding expansion and mergers have obvious flow-on implications for the road and rail infrastructure needs of the surrounding area. But the decisions by ports are generally made in isolation from those broader implications. And the government needs to either try to predict ports' decisions or react to them *ex-post*. Neither approach seems ideal.

Similarly, parts of the government are making choices regarding tertiary education funding and research funding. They can be coordinated and informed by a broader development strategy, or devolved to operational agencies to make on the basis of their sector knowledge – with varying degrees of sector input.

Beyond this, changes to other capabilities, such as regulation, institutions, networks etc, may also be required to facilitate economic growth. Lipsey *et al* 2005 (Part IV, especially page 517ff) present a fuller exposition of these issues, and in particular identify two such approaches.

First, changes in technology will often require changes in what Lipsey *et al* term the facilitating structure to be effective. (The facilitating structure is defined by Carlaw in Procter *et al* 2008. Broadly it is what we identify as capabilities above). First, changes in technology may necessitate changes in government regulation to support them. For example, New Zealand has recently altered the way it allocates radio spectrum to accommodate changes brought about by the ICT revolution, notably digital television. Secondly, public policy can assist in changes to the facilitating structure that are provided by the government, perhaps because they are subject to major externalities. For example, it may involve changing education to provide training in using the new technology. It may also involve changing elements of publicly owned infrastructure to make best use of the new technologies.

As well as reacting to changing technology, the government may also act to create changes in the facilitating structure that will foster innovation. Examples of such policies include attempts to integrate some university, government, and private-sector research activities; attempts to create technology information networks; and attempts to change private-sector attitudes toward adopting new or different technologies. Furthermore a government can attach structural conditions to funds given to businesses to assist them to develop technologies that they would have developed anyway – for example research labs – in a slightly different way.

Thus there is potentially a good case that fine-grained policies can yield gains over and above those that are available from broad-based policies.

However, such engagement on fine-grained policies poses particular challenges. First and most important, they exacerbate rent seeking concerns, for a number of reasons:

- *The Benefits of Rent Seeking to the Business.* With fine grained policies, the benefits of rent seeking tend to be relatively large for the businesses involved, because it can capture most of the benefits, and because capturing the benefits gives it a competitive advantage over its rivals. This is not true to the same extent for broad-based policies.

- *The Fiscal Cost to the Government is relatively small.* Only a few private sector players are involved, so the assistance provided is not transparent and there is limited impact on the Crown's balance sheet.
- *Political Processes, unlike market processes, can often subsidise losers at the expense of winners.*

These are potentially serious problems, which apply to all policy, but particularly to more fine-grained policies. Because of their potential for undermining productive innovation we should be cautious about pursuing fine-grained policies even where these effects can be mitigated.

Second, identifying the policy requirement and the appropriate policy response, and assessing the resulting costs and benefits will be specific to the particular circumstances of the issue being addressed. This involves a range of skills, including in particular a good understanding of the issues discussed above and good judgement to apply them in a robust way. This clearly will require highly competent officials, which will in itself limit the scope to implement such policies. It also requires deliberate ex-post evaluation to ensure the hoped for gains are in fact being realised. Attention should therefore be focussed on a limited number of areas where the net gains are likely to be greatest. Similar considerations apply to implementation of the policy³³.

Third, and related to the previous point, the resources necessary to implement policy change, both politically and technically, are limited. It is therefore important to focus on policies with a big potential payoff. In particular, in undertaking fine grained policies, it is important to assess the opportunity cost in terms of foregone implementation of other policies, particularly broad brushed ones. An excessive focus on fine grained policies risks the appearance of action rather than the reality.

3.6. Designing Policy to Maximise Net Gains and Limit Risks

The greater the potential costs from rent seeking, the less the potential net benefit of any intervention, and so the more conservative a government should be about implementing such policies. The design of policies and the decision to pursue them needs to take account both of the potential benefits from engagement (discovery) and of the potential costs, including in particular their potential to divert entrepreneurial effort to rent seeking.

The policy challenge therefore is to focus on areas where the potential gains are greatest and to design policy and institutions to limit these costs.

In terms of institutional and policy design, the objective should be to allow market signals to drive policy implementation while limiting the rewards to, and increasing the costs of, rent seeking. In particular this implies the following general principles:

- policy should focus on areas where there is substantial potential to contribute to income levels and growth.
- the focus should be “broad-based” with respect to involvement of particular businesses. Any contracts with individual businesses should reward external benefits, not the business itself.

- commercial risk should be left in the hands of the private sector.
- the particular intervention chosen should be designed to be robust to a number of possible potentially valuable outcomes, in recognition of the radical uncertainty facing any policy intervention³⁴. At the same time, it should protect against socially undesirable outcomes. For example, this points to the desirability of principles-based, rather than rules-based, regulation (while also recognising that the latter may require greater technical competence in implementation).
- policy principles should be set by the polity, but implementation of those principles should be delegated to non-elected officials who apply the principles to particular cases independently. The reason is that rent seeking concerns are sharpest at the implementation stage. Non-elected officials are typically both less responsive to rent-seeking by individual businesses and more easily disciplined if they stray from the approved principles. This approach is now well established in New Zealand practice – for example, with tax law, state financed commercial activities (State Owned Enterprises) and monetary policy.
- policy should be designed by officials with a good understanding of the rationale for the policy, as outlined in this paper, and a good understanding of the parts of the economy to which the policy will apply.
- policy should be designed so that as far as practicable, its ongoing implementation does not require an understanding of the policy rationale. Where this is not feasible (as is true of much of industry policy) the officials tasked with implementing the policy need to have competence and judgement to understand and implement the policy appropriately.
- the officials' decisions and decision processes should be subject to public scrutiny and officials should be accountable for applying the principles in a principled and non-corrupt way.
- institutions and processes should be put in place to reinforce this accountability – for example, watch-dogs (analogous to the Independent Police Complaints Authority and the Privacy Commissioner)
- institutions should be put in place to reinforce an evidence based approach and to counter the tendency for governments to continue backing losers - for example, mandated independent evaluation and sunset clauses.

4. Summary

High and rising levels of material well-being – the key objective of economic policy - result from an evolutionary process of transformation of the economy – the creation of new and better products, processes, business models, organisational forms, markets etc. Thus transformation of the economy is fundamental to economic growth.

Economic development is driven by entrepreneurs in business. They operate in an environment that is so uncertain that it precludes objective optimisation. Using their knowledge and imagination, they grope forward in this radically uncertain environment seeking out profit opportunities. In doing so, they develop profitable new products and methods of producing and marketing them - i.e., they innovate.

Entrepreneurs are motivated by the intrinsic satisfaction innovation yields, by social approval and by material rewards. In particular, profit provides entrepreneurs with the incentive and means to focus on socially valuable innovation and so to add to real output and income per capita. A succession of innovations leads to successive increases in income per capita – in other words, leads to economic growth.

Entrepreneurs are influenced in what they do and how they do it by the natural and institutional environment in which they operate and the capabilities that it provides.

In a modern economy even relatively simple products depend on a complex web of knowledge, institutions, skills, networks and other capabilities for their production. These are highly differentiated and product specific, so that countries that look alike in their resource endowments actually produce different products.

Adapting the production structure to produce a new product requires the development of new knowledge and capabilities. This is difficult, even when the capabilities required to produce the new product are similar to those used to produce existing products. Producing products that need multiple new capabilities is just about impossible.

Thus, when they innovate, entrepreneurs build off the complex web of existing capabilities, and in innovating, create new somewhat different knowledge and capabilities. This in turn creates a new higher foundation of capabilities and knowledge, laying the foundation for more innovation and economic growth. These capabilities are interdependent, so that development of each depends on development of others.

As a result, economic development is systemic in nature and path dependent. It results in an evolutionary transformation of a country's product mix and production structure.

There are two implications of this analysis. First, the highly differentiated nature of products and capabilities means that areas of comparative advantage will be highly differentiated. This means that even a tiny country like New Zealand can realistically

aspire to retaining and developing a sustainable comparative advantage in a few areas.

Second, where a country has developed a comparative advantage, it is likely that it has developed a myriad of related, difficult-to-replicate, world-class, capabilities and resources. It is also likely in future that it will develop new world-class capabilities in products adjacent to its current comparative advantage, creating clusters of businesses with a comparative advantage. These capabilities will be difficult for a country without a similar comparative advantage to replicate.

For New Zealand, this implies in particular a set of capabilities related to the natural resource based industries, together with their related and supporting industries.

Two broad classes of capabilities can be distinguished – those that relate to individual economic agents (such as skills), and systemic capabilities that relate to the interaction between agents. Both are important to innovation. They are summarised in MED's productivity model (Annex 3).

One important systemic capability is a well-functioning market. The market mediates the process of economic development. It integrates the interests of the various actors in an economy. It resolves the enormously complicated problem of aligning the activities of all the actors in the economy and across the world.

However, in any modern economy the market is neither natural nor perfect. Instead, the market and the institutions that underpin it are a human construct. Government action is necessary to create a market which fosters socially productive innovation by giving entrepreneurs the incentive to compete on those margins, and those margins alone, that are socially desirable. And this structure must evolve with changes in the world.

Thus the real question for the government is not whether it should intervene in the market, but where, how and in what circumstances it should intervene.

The objective of and touchstone for intervention should be to facilitate innovation by enhancing the ability, connectedness or incentives of entrepreneurs to spot and pursue socially worthwhile outcomes and by discouraging them from pursuing socially undesirable outcomes.

In order to intervene appropriately, we need to know how a new intervention will impact on productivity growth. Two key ways of assessing the need for intervention are:

- a) Empirical studies identifying what capabilities are conducive to growth.
- b) Theoretical analysis of how markets and the institutions underpinning them may fail to deliver good outcomes.

Empirical studies can identify at a broad level the capabilities that are associated with high income levels and growth rates. While these studies are not without their difficulties, they have the virtue of directly assessing the impact of various interventions on material well-being.

Where such evidence is not available, an analysis of how markets differ from the theoretical ideal posited by neo-classical theory may give us some clues as to where intervention may be appropriate. The particular characteristics include:

1. Uncertainty
2. Incentives
3. Spillovers
4. Path Dependence
5. Information Asymmetries/ Missing Markets
6. Coordination Failures
7. Non-rationality

This analysis must be undertaken judiciously, recognising both that some neo-classical market failures are necessary for innovation and that neo-classical theory will not highlight all areas where capabilities may be deficient – notably the need for mechanisms to promote networking, co-ordination and knowledge flows. It turns out that innovation is particularly problematic – it is replete with characteristics which mean that government action may enable markets to better foster entrepreneurial activity and so economic development.

The New Zealand economy, like any modern economy, has in place a complex web of government interventions – taxes, publicly provided goods, regulations governing social and economic behaviour, enforcement mechanisms etc.

Much of the complex web is aimed at addressing income growth. In addition, governments intervene for a variety of other economic and non-economic reasons. The New Zealand government for example has a heavy hand in health, education and welfare. And it has to finance these and other interventions through the tax system. The design of these interventions also has the potential to impact on growth.

At any point in time, there may be situations where further or different interventions will better provide people with ability or incentives to spot and pursue socially worthwhile outcomes.

While ongoing government action to maintain and improve the working of the market is necessary and inevitable, it is not without its costs. In addition to the resource costs that any such action may impose, it raises the potential for rent-seeking, either by those in government or by those who can influence the government. The latter in particular risks diverting entrepreneurial effort away from socially productive innovation. In addition, in making and implementing policy, those doing so face the same uncertainty as do entrepreneurs. If they do not adduce appropriate evidence, or if they lack the competence to design and implement effective policy, there is a risk that the potential benefits of policy may be forgone.

Thus an assessment of whether and how to intervene in any particular case involves an assessment of the costs and benefits of intervening.

For broad-based economy-wide policies, like competition policy, there is often independent statistical evidence (cross country studies etc) on the potential gains from intervention. In addition, because any business looking to rent-see faces a

free-rider problem (its competitors benefit from any rent-gaining intervention it manages to promote), the risks of rent-seeking are relatively manageable.

On the whole, New Zealand's broad-based policies are regarded as approaching best-practice. However, the Economic Indicators Report 2007 (Ministry of Economic Development *et al* 2007) provides some evidence that further significant improvements are likely to be possible. Because even small policy improvements add up across the economy as a whole, they should continue to be pursued.

For more fine-grained policies, the opportunities for rent seeking tend to be more sharply focussed on a smaller group of businesses, making rent seeking more profitable. There is often little statistical evidence of the benefits of a particular policy. And the government is not close to the market. As a result, the government suffers from an even worse problem of radical uncertainty in implementing fine-grained policies than entrepreneurs do in pursuing profit opportunities. In order to get more robust information, it must engage with the businesses that are close to the relevant market and elicit information from them. This provides businesses with further scope for rent-seeking behaviour.

The risk of rent-seeking behaviour can be reduced (but not eliminated) by establishing and following a set of principles that take account of uncertainty and apply transparent and market-based incentives to the process of intervention.

Furthermore, implementation of fine grained policies often requires a case by case assessment of the likely economic benefits from intervention and design of policy to realise them. This requires a good understanding of the nature of the economic benefits and of the part of the economy to which the intervention will be applied. This is likely to be a complex task, and the skills available to undertake it are likely to be in short supply.

These considerations suggest caution in undertaking more fine-grained intervention.

At the same time, the benefits from these fine-grained policies are potentially substantial, and may outweigh these and other costs of intervention. In particular, as discussed earlier, the multiple capabilities required for achieving comparative advantage will be highly specific. Business can be expected to develop the capabilities within its purview, but exploiting the opportunity may also need government action - for example, to deal with issues (e.g., inappropriate regulation or missing institutions) that can only be addressed by the government. These issues can often only be identified and dealt with at a more detailed level than broad-based policies typically address.

In addition, direct engagement with the relevant businesses makes coordinated action possible, allowing both parties to achieve gains that each individually could otherwise achieve. For example, if the government simply reacts passively to transport demands, and businesses make their decisions on demand for transport infrastructure based on their projections of that response, solutions which better serve business needs may be neglected.

Stiglitz 2005 (pp27-29) summarises the need for and design of industry policy and other more fine-grained policies well.

“In some sense, this means that the government cannot avoid addressing issues of industry policy. The government plays a central role in the economy. In addition to [a] large role ...in finance, it is pivotal in research and education as well. Infrastructure is another area....Decisions it makes in these areas – which areas of research to support, how to design the curriculum, where to build roads and airports, help shape the economy and its competitiveness. It is better these decisions be made with a view to where the economy is going....

Modern industrial policy is not involved in micro-management of the economy. Critics of industrial policy say the government is not in a position to “pick winners”. And it should not do so. But this misses the point, in two respects. The government intervenes in the market not because it does not have faith in the market’s ability to pick winners...but rather because it recognizes that there are market failures of the kind noted earlier. By the same token, modern industrial policy is often “broad gauged” and, so far as possible, attempts to employ market-like mechanisms in its implementation....

A key part of this broad-gauged policy will be working to enhance the economy’s flexibility....

Modern industrial policy may entail “negative” policies as much as positive, recognising that speculative real estate may contribute less to employment and growth than other sectors, and may expose the economy to greater instability. Thus it may make sense to restrict the extent of bank lending....

While broad-gauged policies reduce the necessity of the government “picking winners”, there is no way that the government can avoid forming a “vision” of where the economy is going”.

5. Conclusions

In the end the decision on where and how to intervene must involve a judgement about the various benefits and costs involved:

- on the one hand, the benefits to growth from intervening, the benefits from engagement of being better informed about the precise nature of the intervention required and the benefits of coordinated action;
- on the other, the costs of poorly directed policy, the resource cost of regulation and the possible costs imposed by rent seeking.

Making a decision about whether and how to intervene is not easy. However, what is clear is that the government cannot avoid the question. It must choose where and how to intervene - not intervening is not an option.

My own judgement is that there is scope for further broad-based measures to improve New Zealand's economic growth performance. When interpreted in New Zealand's context, including in particular the impact of our distance from the rest of the world, the Economic Development Indicators (Ministry of Economic Development *et al* 2007) indicate a range of interrelated areas that may be deserving of attention - for example, capital markets and exchange rate cyclicity.

In addition, there will be circumstances where it is beneficial to go beyond broad-based policies that can be justified on the basis of robust statistical evidence. For example, we are unlikely to get the best outcome by allowing various parts of the transport infrastructure in the top half of the North Island to evolve organically in response to increasing demand. An integrated approach to the provision of that infrastructure would consider the impact of various transport modes on each other, the impact of providing various forms of infrastructure on economic development and transport demands, and the further impact of those transport demands (for example on congestion in Auckland, and on development of the Auckland waterfront).

At the same time, the information needs and rent-seeking opportunities associated with such interventions, and the danger that pursuing them will crowd out improvements in broad based policy, mean that a cautious approach and careful design and implementation are required to minimise the risks. In addition, successful design and implementation requires a high degree of competence on the part of officials. This will limit the scope for implementing such policies, reinforcing the need to focus policy attention where the scope for net gains is greatest.

Annex 1: Economic Growth: the Objective of Economic Policy

Standard economic theory argues that competitive markets are efficient, and that Adam Smith's invisible hand will lead to a unique and optimal allocation of resources. This result, which is known as the first fundamental theorem of welfare economics, was formalised by Arrow and Debreu. As a result, it is sometimes assumed that we do not need to take a view about the level and growth rate of per capita incomes. Instead it is assumed that we can depend on people to look after their own interests, so that enabling people to transact effectively in markets is necessary and sufficient to ensure an optimal or near-optimal outcome.

However, the first fundamental theorem of welfare economics is only valid under quite stringent conditions. In particular, it assumes that a complete set of markets exist (including insurance markets against every possible risk and uncertainty), that all agents share the same set of information (e.g., about possible future states of the world, including about current and future technologies, and about the probability of different future states occurring), that there are no externalities or public goods and that there are no significant increasing returns.

Of course, nobody actually believes that these conditions actually hold. The assumption was that this model was a good approximation to what actually happened in the real world. However, work by Professor Joseph Stiglitz and others on the Economics of Information, for which Stiglitz received the Nobel Prize, show that even a small information imperfection can have a profound effect on outcomes. Information asymmetries can for example destroy markets that would exist if people share the same information set.

Accordingly, the absence of the above conditions undermines the standard argument for reliance on markets with limited government involvement. Market failures are important and pervasive.

Notwithstanding these concerns, almost all economists would accept that the primary means of organising an economy and connecting producers and consumers should be the market. An economy is a complex system, and markets appear to be very effective (though not perfect) at resolving the enormously complicated problem of coordinating actions of individuals and businesses across the economy and indeed across the world (Stiglitz 2004). And as well as recognising the failures of markets, we also need to be aware that both because of the incentives they face and because of their lack of knowledge, governments can also fail to deliver welfare improving interventions.

However, the result above means that we cannot rely on markets by themselves to reach a unique welfare maximising, or even a particularly good, outcome. This is particularly true for the market for innovation and so for economic growth.

The implication of this discussion is that there is no robust argument to argue for or against any particular objective for economic policy, especially where per capita

income growth is concerned. In particular, standard economic theory, while it sensibly focuses on consumer welfare, does not allow us to translate that focus into a robust policy prescription. Despite this, many mainstream economists continue to act as if the first fundamental theorem of welfare economics more or less holds.

Nelson and Winter put it this way. They acknowledge that many would see such an attack on orthodoxy as attacking a straw man. However, they argue that a theoretical orthodoxy does exist that fundamentally undermines the ability of economics to understand economic growth and makes the assumption that markets lead to optimal outcomes invalid. They state “This is particularly so with views concerning the efficiency properties of market systems: there seems to be a remarkable tendency for discussion of this question to throw off the encumbrances of advanced learning and revert to a more primitive and vigorous form. ...It is a caricature to associate orthodoxy with analysis of static equilibria, but it is no caricature to remark that continued reliance on equilibrium analysis, even in its more flexible forms, still leaves the discipline largely blind to phenomena associated with historical change. Thus although it is not literally appropriate to stigmatize orthodoxy as concerned only with hypothetical situations of perfect information and static equilibrium, the prevalence of analogous restrictions in advanced work lends a metaphorical validity to the complaint....Last there is one key assumption in the structure of orthodox thought that [gets great weight in] advanced theory. This is the assumption that economic actors are rational in the sense that they optimize....” (Nelson and Winter 1982, pages 7-8).

The upshot of all this is that we have no value-free method of determining what economic policy should be trying to achieve. We are therefore left with the need to use judgement, informed by empirical data of various kinds, to decide what we should be trying to achieve through economic policy, and how it might best be achieved.

Many authors who write about economic development tend to the view that a key objective of economic policy should be to achieve growth in material well-being, which we proxy by growth in income per capita, and that the primary way that should be achieved is through increases in income per hour worked. Two examples are:

- Baumol suggests that “the capitalist economy can usefully be viewed as a machine whose primary product is economic growth” (Baumol 2002, page 1).
- The recent World Bank work reviewing the lessons of the 1990s, emphasises the need to have a growth strategy and not just focus on economic efficiency (World Bank 2005, page 10).

I concur. It is clear that productivity growth has been fundamental to material wellbeing. It dwarfs other reasons for gains in material wellbeing. (In contrast, static efficiency gains are generally estimated to be tiny). Economic evidence suggests that, over the longer term, productivity growth is responsible for all but a small fraction of a country’s growth in income per capita. (Baumol 2002, page 3). From 1820 to 1998, income per head in the developed world grew about 19 times, after adjusting for inflation (Maddison 2001). Most, if not all, of this growth has come from improvements in productivity.

Our approach of using growth in income per hour worked as the objective of economic policy approach clearly relies on judgement in application³⁵, since not all approaches to implementing it will be equally desirable. Often it will lead to conclusions that are consistent with traditional neo-classical analysis. And often neoclassical analysis will be useful for isolating issues that need to be addresses, as outlined in the main body of this paper. But to act as if the first fundamental welfare theorem is more or less right will often be seriously misleading, particularly where innovation and economic growth is involved.

Annex 2: Porter's Approach: The Competitive Advantage of Nations

Porter 1990 (page 72 ff) identifies four broad classes of capabilities that he considers important for a nation to be a desirable home base for competing in an industry:

- Factor conditions: the nation's position in the inputs needed to compete - factors of production, such as skilled labour, knowledge resources, natural resources or infrastructure, necessary to compete in a given industry. He sees the most important of these as created rather than inherited.
- Demand conditions: sophisticated and substantial home demand for the industries' product or service, pressuring businesses to innovate earlier and faster than their rivals, and allowing them to exploit economies of scale and learning. Arguably, New Zealand's small size makes this quite difficult to achieve. (Many New Zealand companies have instead tapped directly into sophisticated overseas demand – e.g., Rakon, Buckley Systems, and so on).
- Related and supporting industries (i.e., industries that can share activities in the value chain, such as distribution channels, or that can share proprietary skills): the presence or absence in the nation of supplier industries and related industries that are internationally competitive. (Many New Zealand high tech businesses are one of a kind and have little if any supporting infrastructure. F&P Healthcare, Rakon, Vega, Buckley systems, Wellington Drive Technologies, Obo, Ibex, Phitek are examples).
- Business strategy, structure and rivalry: the conditions in the nation governing how companies are created, organised, and managed, and the nature of domestic rivalry.

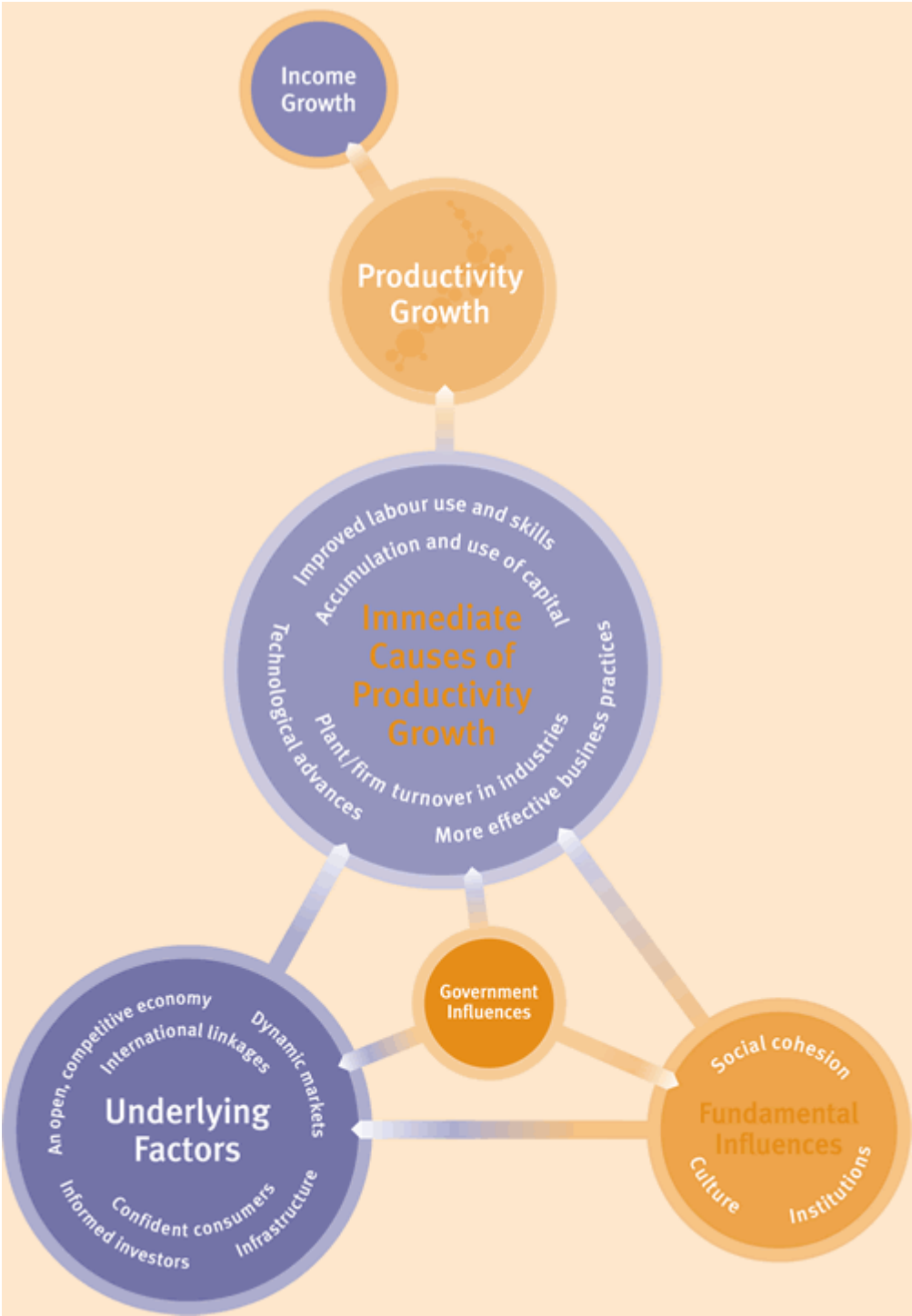
He considers that nations succeed in particular industries because their home environment is the most dynamic and the most challenging, and it stimulates and prods businesses to upgrade and widen their advantages over time.

To these capabilities, Porter adds chance and government. Within the latter he cites anti-trust policy to promote and shape domestic rivalry (minimal in many key New Zealand sectors), regulation which shapes home demand, investment in education to change factor conditions, and government purchases to stimulate related and supporting industries.

When the Porter framework was applied to New Zealand in 1991, the study found that very few New Zealand industries had developed the multiple sources of competitive advantage needed to upgrade New Zealand's comparative advantage (Crocombe, Enright and Porter 1991, Chapter 5).

While some things have changed since then, there seems little reason to doubt that Porter's broad conclusions about New Zealand still hold.

Annex 3: MED's Productivity Model



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Endnotes

- 1 http://en.wikipedia.org/wiki/Rent_seeking
- 2 This document synthesises work by other authors. In particular it draws heavily on three sets of authors – Carlaw, Lipsey and Bekar; Hausman, Rodrik and their co-authors; and Douglas North. Some of their work is cited in the bibliography. The document focuses on telling a story of what occurs when we get economic growth, and what that implies for policy. The evidence for this story varies. Some parts of the story have an extensive empirical justification, whereas others are largely judgement, based on whatever evidence is available.
- 3 Annex 1 lays out why I assume that high and increasing material well-being should be the central objective of economic policy.
- 4 These other issues include many that are central to well-being, as well as being related to economic performance (see for example Treasury 2001). They are worthy of extended discussion in their own right. They include the relationships between material well-being, welfare, happiness, freedom; sustainability, discount rates, intergenerational equity, interpersonal equity and social cohesion and its impact on economic growth, and so on.
- 5 The description of economic growth presented here can be thought of as being part of the literature known as heterodox and/or evolutionary economics. (See Nelson and Winter 1982 page 35 ff for a summary of these schools). My presentation is similar to, but presented in a different way from, the determinants of the competitive advantage of nations, as described by Porter 1990, page 72ff. Annex 2 gives a description of the Porter framework and its findings about New Zealand. It argues that the broad conclusions of the 1991 Porter study of New Zealand – that New Zealand has not developed the multiple sources of competitive advantage necessary to create sustainable competitive advantage - remain broadly valid.
- 6 Upgraded production includes the use of upgraded inputs, which has been a critical source of competitive advantage in New Zealand's pastoral industries.
- 7 I make little distinction in what follows between entrepreneurs and businesses. Sautet 2000 gives a fuller description of the relationship. He makes the point that almost all economic agents are entrepreneurs in the sense described here. For example, workers must try to sniff out what jobs are available to them, and choose amongst those that they can identify on the basis of incomplete information. Sautet distinguishes these from the entrepreneur-promoter, who is the one that coordinates resources, including other entrepreneurs, in a planned entrepreneurial way within a business.
- 8 North explores in detail how entrepreneurs make sense of the world (North 2005, for example at page 38ff). In effect they create models of the world from experience and then behave as if that model were reality.
- 9 Corporate strategies will often emphasise approaches that focus primarily on product quality or technology leadership, with profit as a spin-off. For example, Angus Tait argued that you focus on the functionality of the product you are delivering to a customer and profit will come from that further down the track. That is, a primary focus on profit takes the eye off the innovation that is needed to create consumer value and so sustained profitability.
- 10 This has meant that even supposed experts have made predictions that turn out in retrospect to be wildly inaccurate. See <http://www.didyouknow.cd/predictions.htm> for some examples
- 11 Provided the incentives are right – see below.
- 12 Although successful innovation typically leads to an increase in productivity, these are not identical. The increase in productivity will typically lag the innovation (Lipsey *et al* 2005, appendix to Ch 4).
- 13 The commercialisation of electricity is an example that started with basic science for its own sake. The opposite direction of causality is also common. For example, Pasteur was tackling very practical quality control issues in the French wine industry and as a spin-off created much of the basic science underpinning biochemistry.

14 It is immediately obvious from this discussion that those who led the initial discovery and development of electricity would have had no idea of, and could not profit from, the myriad uses to which it would subsequently be put. The spillovers from the discovery of electricity have vastly exceeded any return that was gained from those who first discovered and commercialised it. This is an example of the more general point that innovation can and generally does lead to substantial spillovers.

15 This is their example:

“Let us consider, for example, a market as apparently simple and straightforward as the real estate market. In this market, assets already exist, they just need to change hands. Buyers need to find out what properties are on sale and what their specific characteristics are. Sellers need to transmit that information to buyers. So a market of real estate brokers develops to achieve these goals. Now, not all the characteristics of a house or apartment are easily visible to a naked untrained eye. There may be hidden defects in the house that the owner knows about and has an interest in concealing from the buyer. This creates an asymmetric information problem that is addressed through a market for inspectors. These inspectors are licensed by some entity and hired by the buyer to report on the conditions of the property and its abidance by the building code.

Then it is important to know whether the seller has full rights to the property and that there are no liens or other impediments on his right to sell. This implies that a buyer may pay, only to find out that others also have a legal claim on the property. A system of property registries and a system to track financial and tax claims are needed. But it may be inefficient for the buyer to bear the risk of any surprises, so a market for title insurance is helpful. Also, public authorities may have imposed some easements on that property to secure some public interest, or there may be municipal plans to change the conditions around the property that may significantly affect its value.

In addition, the buyer needs finance to purchase the home, for which he needs a market for loans. To address willingness to pay and other incentive and information problems in this market it is convenient to be able to pledge the house as collateral to a lender with a set of rights in case the buyer does not abide by the mortgage contract. A legal system needs to enforce these rights. The lender may also require insurance against fire, storms, etc, lest the collateral blow up in smoke. Hence, a home insurance market is needed.

Furthermore, the sale takes time because after an initial agreement has been reached, the inspection needs to take place and the buyer needs to secure financing, title insurance and home insurance. Many unexpected events may happen during that process and it is important to clarify how to deal with them. It may be helpful to require a deposit, a down payment or establish an escrow account to deal with some of these contractual problems, for which a real estate lawyer is needed. The real estate lawyer in turn needs to be accredited (by some body) to carry these functions. If the property is an apartment in a condominium, it is important that the rights and obligations of the apartment owner vis-a-vis the rest of the condominium be clearly established and understood.

The previous paragraph shows how complex a simple transaction such as the sale of an existing property actually is and how it is related to a network of markets and institutional arrangements that must co-exist. We described not just a market for homes, but also a market for brokers, mortgage loans, inspections, title and home insurance and lawyers. It involves registries, municipal rules, accreditation of the different specialized agents, rules on creditor rights and condominiums, etc. And this is just some of what is required for trade in existing homes. Imagine now the added complexity involved in urban development and construction.”

16 Strictly, because comparative advantage is a relative concept, so is this statement about capabilities and resources. We only need it to hold true in a relative sense. But for a first world country, it will be approximately true in an absolute sense as well.

17 The institutions that a country has depend on its history, and are difficult to change. Thus, like growth itself, the institutions a country has are path dependent. New Zealand is ranked 24th in the world in global competitiveness by the World Economic Forum, behind many OECD

countries but ahead of most middle and lower income countries (World Economic Forum 2008).

18 Provided non-material incentives are also consistent with the pursuit of profit seeking behaviour, as is discussed in section 2.42.3 above.

19 That of course is the approach adopted in this paper.

20 See <http://www.economist.com/research/Economics/alphabetic.cfm?term=rent#rent> for a definition of economic rents

21 See the discussion in Annex 1, particularly the quote from North, for a fuller discussion of this point

22 In using the term “market failure” here, I am adopting a more extensive use of the term than is common. As the subsequent discussion makes clear, it includes, for example, measures promoting macro-economic stability to reduce uncertainty and consumer protection legislation designed to stop businesses competing along inappropriate margins.

23 Because humans have bounded rationality, a typical individual simply cannot know all the legislation that governs their behaviour. As a result it is important that if an individual acts as they believe a reasonable person should, they will typically be complying with the legislation governing their behaviour – hence the need for regulation to be “intuitive”.

24 As with most innovations, the production line was refined over time, and it actually had its origins in earlier manufacturing processes – for example, in the meat industry and in firearms manufacture.

25 This is not to claim that it is easy to predict paths of future growth potential: it is much easier to look back and explain where we have come from and how, than to look forward to where we will go. However, the foregoing evidence does suggest that it is likely to be difficult for the government to attempt to create a “new” cluster in an area not closely linked to one in which the country has demonstrated capabilities.

Porter makes a similar point. His view is that government policy will be far more likely to succeed in reinforcing an existing or nascent industry cluster than in trying to promote an entirely new one, however tempting it might be for national prestige. Perhaps the most beneficial way is through investments to create specialised factors and specialised infrastructure. (Porter 1990, page 655-657)

26 A simple example of such welfare improving government intervention is the law requiring drivers to drive on the left of the road. Agreement on this would be just about impossible to achieve without government action, and it would be very difficult for anyone to profit from achieving it.

27 Rent seeking occurs when an individual, organization or business seeks to make money by manipulating the economic and/or legal environment rather than by trade and production of wealth. See http://en.wikipedia.org/wiki/Rent_seeking.

28 That is, evaluation that is in the top two or three steps of Storey’s “Six steps to heaven” (Storey 1998). An example of such an evaluation in the New Zealand context is to be published shortly as an MED Occasional Paper.

29 I use the novel terms “broad-based policies” to refer to more generic policies, rather than the more normal “framework policies” or “regulatory policies”. Likewise, I use the term “fine-grained” rather than the more normal “facilitative policies” or “industry policies”. The reason is that industry policy can be non-discretionary and quite broad (e.g., export market development assistance). Likewise, regulation can be both discretionary and very fine grained – for example, the so called “rifle shot” provisions in the US Income Tax Legislation (these appear to be drafted in a generic way, but are actually drafted to apply to one particular company).

30 Areas highlighted by the indicators include:

- Investment/savings (Savings, Balance of payments, NFAP, Investment composition, Equity market development Outward FDI);
- International Linkages (Trade, Exchange Rate Stability, Innovation linkages, Outward FDI);

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- Tax;
 - Infrastructure;
 - R&D;
 - Management skills;
 - Secondary school dropout rates; and
 - The mix of tertiary education.

Many of these are already the subject of current policy action.

31 The distinction between broad-based and fine-grained policies is not clear cut as this discussion implies. Rather there is a range of policies, across several dimensions. Policies can be more or less broad-based (e.g., general competition policy versus regulation of natural monopolies), evidence can be more or less robust and applicable to New Zealand, and so on. This merely reinforces the point that we have no option but to choose where and where not to intervene.

Related to this, it is important to realise that no policy, no matter how designed, is “neutral”. Even in as seemingly an innocuous policy as a rule for filing tax returns that applies equally to small and large businesses, tend to favour large businesses over small, because the ratio of compliance costs to profits is less. The same is true of more substantive policies. Thus an appeal to the neutrality of generic policies is essentially vacuous.

32 Some empirical evidence may be available. For example, there may be evaluations of relevant policies that have been applied in other jurisdictions. Micro-data analysis and case study analysis can also provide useful information.

33 In assessing the comparative performance of successful and unsuccessful economies, Struan Little makes clear that both successful and unsuccessful economies have adopted fine grained policies, and indeed many other policies (Little 2001). The detailed design and implementation of policies, and the context in which they are implemented, are important.

34 For example, any attempt to determine likely future areas of competitive advantage should avoid "picking winners" but instead try to identify areas which New Zealand is more likely to be competitive in the future, if we applied a level playing field. By focussing effort on those areas, we are "going with the flow" rather than against it, and therefore we are more likely to generate the momentum (clusters etc) that will yield success. At the same time, we need to be humble about our ability to predict the future in the face of radical uncertainty, so this is about slanting our effort to areas where the potential payoffs are likely to be best, rather than picking winners. We might, for example, put 50% more effort in research, training, industry policy, etc, into those areas than comparable areas where New Zealand had only average prospects (and vice versa into areas where New Zealand had probable competitive disadvantage).

35 It is perhaps worth making the point that adopting any objective for economic policy, including traditional ones such as the “Washington Consensus”, relies on judgement. This is because the only formal proofs are based at models that are clearly at odds with reality. That is not a criticism of the models. As the quote attributed to George Box, the industrial statistician, states ‘all models are wrong, some are useful’. The trick is to work out which models are useful in which circumstances.