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The Dutch Disease in Australia:  
Policy Options for a Three-Speed Economy

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# **The Dutch Disease in Australia: Policy Options for a Three-Speed Economy\***

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## **Abstract**

This paper expounds the concept of Dutch Disease as it applies currently to Australia, noting the various gains and losses resulting from the Australian mining boom. “Dutch Disease” refers to the adverse effects through real exchange rate appreciation that such a boom can have on various export and import-competing industries. Particular firms or industries may be both gainers and losers. The distinction is made between the Booming Sector (mining), the Lagging Sector (exports not part of the Booming Sector, and import-competing goods and services), and the Non-tradable Sector.

The main discussion focuses on policy options, given a floating exchange rate regime. What should the government do – if anything – to reduce or avoid this Dutch “disease”? The principal options are: Do nothing, piecemeal protectionism, and run a fiscal surplus, combined with lowering the interest rate and possibly establishing a Sovereign Wealth Fund. Piecemeal protectionism is likely to be politically popular but there are strong arguments against it. The costs of any measures that successfully moderate real appreciation of the exchange rate and thus Dutch Disease effects are noted, and may be considerable. This is “exchange rate protection”. Gains to some industries are likely to be balanced by losses to others. It is shown, surprisingly, that a fiscal surplus that is financed by taxation of the profits of the Booming Sector may not significantly moderate real appreciation. The reason is that this sector is to a significant extent foreign owned.

An issue is whether firms and industries can be clearly divided into those that belong to the Non-tradable Sector and those that belong to the Lagging Sector, the latter being the losers from Dutch Disease. If such a clear distinction cannot usually be made, then the case for “doing nothing” is strengthened.

**JEL classification:** E63, F41, Q33

**Keywords:** Dutch Disease, resource boom, macroeconomic policy, exchange rate protection, sovereign wealth fund, Australia

From 2005 to 2011 the Australian mining industry (gross value added) grew about 85%. This was by value measured in Australian dollars. During the same period the value of Australian GDP grew 41%. Exports of the mining industry's products – principally iron ore and coal – grew 100% in value. This reflected, to a great extent, increases in prices – in fact a 41% increase in Australia's terms of trade. The cause was primarily an increase in demand from China. With GDP in the rest of the economy growing by 39% over this period, all this is summed up by the popular Australian term “the two speed economy”.<sup>1</sup>

The mining boom was the principal – but by no means only – cause of a substantial 31% real appreciation of the Australian dollar over the period, (as measured by an index of the trade-weighted exchange rate). In turn this real appreciation had an adverse effect on at least some (and perhaps many) import-competing and non-mining export industries. These were the losers from the mining boom.

It is these losers that the theory of the Dutch Disease focuses on. Thus Australia is now really not a “two-speed” but a “three speed” economy. The fast moving part is the Booming Sector, the slow moving or even declining part is the Lagging Sector, and the rest – which is the largest part and where there are almost certainly net gains – is the Non-tradable Sector.

The theory of the Dutch Disease analyses the way a sectoral boom affects other parts of the economy, especially the parts affected adversely. There is an extensive worldwide literature in this field. This paper rests on a standard model presented in Corden and Neary (1982), and more concisely as the “Core Model” in Corden (1984, Section I)<sup>2</sup>.

In section I of the present paper I give a brief overview of the Dutch Disease story, or at least the part that is described in these earlier articles as the Spending Effect. Unlike in the earlier papers, monetary considerations are briefly introduced here. The main

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<sup>1</sup> The figures quoted here mostly report changes between the fiscal years 2005–06 and 2010–11. Arguably the current mining boom began in 2005.

<sup>2</sup> Pioneering Australian contributions are Gregory (1976) and Snape (1977).

part of the paper is in section II, which discusses in detail and perhaps controversially three policy options for governments. In section III I discuss various complications.

The emphasis in this paper is, above all, analytical. An excellent survey of what has happened in the Australian mining industry in recent years, the reasons for the boom, the historical background, and the impact on the rest of the economy is in Connolly and Orsmond (2011)<sup>3</sup>.

## I. INTRODUCING THE DUTCH DISEASE

### 1. Export Boom and Capital Inflow

I assume realistically that the Australian exchange rate floats, thus responding to supply and demand of foreign currency relative to the Australian dollar. There is no intervention in the foreign exchange market by Australia's central bank, the Reserve Bank of Australia (RBA).

Export income of the Australian mining sector – called the Booming Sector here – increases sharply owing to higher international prices, and this appreciates the exchange rate. As a delayed result of the higher prices the quantity of exports also increases, though so far this increase has been modest. The net result is a big, indeed dramatic, rise in incomes in that sector. A further by-product is that foreign capital flows into the sector, to finance its development. This capital inflow also appreciates the exchange rate.

Spending of the sector rises thus both because of the higher incomes caused by the higher prices and outputs and because of the increased capital investment, substantially financed by foreign capital inflow. Some of the spending goes on imports, on the remittance of dividends abroad, and on the purchase of foreign assets of various kinds. These involve an outflow of funds from Australia and thus

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<sup>3</sup> In addition, a concise historical overview of Australia's five mining booms, beginning with the gold rush of the 1850s, is in Battellino (2010). More details of the current boom in iron ore, coal and gas (LNG) are in Christie et al (2011). While the boom so far is mainly in iron ore and coal, investment planned in Liquefied Natural Gas (LNG) development is substantial and a boom in investment, production and exports of LNG is in prospect. See Jacobs (2011).

depreciate the exchange. But there is still a net appreciation. Imports and the various other outflows just moderate the initial appreciation.

Funds that are not spent abroad are spent at home. This is the Spending Effect, which plays a key role in Dutch Disease theory. It is important to underline that it refers only to spending at home, i.e. in Australia. The funds are spent either directly by the companies concerned (including on intermediate inputs), or indirectly by the recipients of the higher incomes. In addition, higher profits, royalties, and some additional taxes will lead to more tax revenue being paid, and this will lead to more government spending and more spending by other taxpayers and by citizens who benefit from reduced taxes they pay and from extra benefits received.

## **2. The Three Sectors**

The whole economy can be divided into the Non-tradable Sector and the Tradable Sector. The Non-tradable Sector consists of those industries or activities the prices of which are determined by demand and supply domestically. It is dominated by services of various kinds. The Tradable Sector consists of export and import-competing industries. These are industries the prices of which are determined, at least to a considerable extent, in the world market, set by world prices and the exchange rate.

In turn the Tradable Sector can be divided between the Booming Sector and the Lagging Sector. In Australia the Booming Sector consists of the mining industries, principally at present iron ore and coal producers and exporters. The Lagging Sector consists of the export and import-competing industries that lag behind (as the name suggests). This sector – which is the locus of the Dutch Disease problem – consists of a part of manufacturing industry, of part of agriculture and of certain services, principally those provided by the tourism industry and the export-of-education industry. Their prices are given in the world market (or heavily influenced by such prices) and have not risen in the way that booming sector prices have. Hence an exchange rate appreciation lowers their prices in terms of Australian dollars. These Dutch Disease industries are the losers in the three-speed economy.

Thus the economy outside the Booming Sector can be divided into two parts, namely the Non-tradable Sector and the Lagging Sector. This division is actually an over-simplification and there are various complications I shall discuss in section III.1 below. But for the time being it is helpful to adhere to the simple classification.

Going back to the beginning of our story, it follows that the mining or resources boom brings about both an increase in domestic spending on Non-tradables, which is expansionary, and an exchange rate appreciation that is contractionary. The first effect raises the outputs of Non-tradables and the second effect reduces the profitability and outputs in the Lagging Sector, which is the Dutch Disease effect.

### **3. Internal Balance**

I assume that interest rate policy is managed by the Reserve Bank of Australia (RBA) to maintain “internal balance”. This might be aimed at keeping the inflation rate or the rate of unemployment approximately constant, or some compromise between these two objectives. Suppose that, with a given interest rate, the net effect would be expansionary, essentially because of the Spending Effect of the boom. Then the RBA would raise the interest rate, and this would contract the economy through two channels: aggregate spending would decline in the usual way, and foreign capital would be drawn into Australia through the higher interest rate, and this would increase the appreciation of the exchange rate. Of course, the higher interest rate would also lead to less domestic capital outflow.

### **4. Summary up to this Point**

What is the conclusion at this stage? When there is a booming sector among exports – like the Australian mining sector – or among import-competing industries, the exchange rate appreciates. Similarly, when there is substantial net capital inflow the exchange rate appreciates. And appreciation has an adverse effect on non-boom parts of the tradable sector – i.e. the Lagging Sector. In Australia’s case this includes parts of manufacturing but also agriculture, tourism and education. Real appreciation is a key part of the market process that shifts Australian factors of production as required

not just into the Booming Sector but also into the Non-Tradable Sector, and out of the Lagging Sector.

Who then are the gainers and the losers? Obviously, shareholders, executives and employees in the Booming Sector benefit. But here one must bear in mind the substantial foreign ownership share of the principal companies<sup>4</sup>. If the Booming Sector pays significant taxes on its increased income the benefits may spread through the community beyond the gains to Australian shareholders and employees<sup>5</sup>. In addition, others in the community will benefit when the pattern of domestic demand shifts in their favour. The losers are, above all, the producers in the Lagging Sector. And that is the Dutch Disease problem. This problem arose in the Netherlands in the sixties as a result of its natural gas discoveries in the North Sea.

Essentially this Dutch Disease effect is brought about by real appreciation relative to the alternative situation with no boom. If the boom plus nominal appreciation led to a process that raised the price level of non-tradables above where it would have been otherwise (as is likely), then real appreciation would have been greater than nominal appreciation. The assumption of “internal balance” as described here implies that, in general any nominal appreciation will lead to real appreciation, but not necessarily to exactly the same extent.

There is another aspect to this matter. The Dutch Disease is the negative side of the real appreciation coin. The positive side of the same coin is the favourable effect of real appreciation on the Non-tradable Sector – i.e. specifically on wage earners, who make up the greater part of that sector and who are consumers of imports. Apart from the direct gainers in the Booming Sector (including the gainers from taxation of that sector) the biggest gainers from the resources boom have been consumers of imports,

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<sup>4</sup> “ Overall, based on published data by the iron ore, coal and LNG producers, effective foreign ownership of the current mining operations in Australia could be around four-fifths.” (Connolly and Orsmond, 2011, p.143). But Connolly and Orsmond emphasize that “The foreign ownership share of the mining industry is difficult to determine.” See also footnote 15 below.

<sup>5</sup> Unfortunately up to date tax revenue figures are not available at the time of writing. The following information comes from Connolly and Orsmond (2011). In 2008/09 royalties and company income taxes paid by mining were about 2% of GDP. As the share of the gross value of output of mining it was about 15% over the decade. I would guess that in the latter part of 2011 the tax proportions were considerably higher.



who have faced sharply reduced prices of imports (relative to the prices of domestic supplies to final demand) as a result of the appreciation.

In an important article Gregory and Sheehan (2011) have shown the following. Between the March quarters of 2003 and 2008 the Australian real trade-weighted exchange rate rose by 36.5%, and this has had an impressive effect on boosting domestic real incomes of wage earners. Real employee compensation per hour worked – which is the *real consumption wage* – rose by 3.5% per annum over this period. This can be compared with 1.3% per annum over the earlier period 1979–2003, when the exchange rate had not appreciated.

These figures should then be contrasted with the movement of the *real product wage*, which is wages as a cost – namely hourly compensation deflated by the GDP or other value added deflator. Over the eight years 2003 to 2011 the *real product wage* grew by only 0.7% per annum, while the *real consumption wage* rose much more, namely by 2.6% per annum. The excess of the growth of the real consumption wage (the wage as *income*) over the growth of the real product wage (the wage as *cost*) was explained by the high real appreciation.

It is the *product wage* that affects employment. Therefore, this effect of high appreciation does not just influence income distribution. It seems likely that the low growth rate of the *real product wage* was partly made possible by the fact that, even with that low growth rate, wage earners were gaining significantly through the high growth of the consumption wage caused by the decline in import prices, in turn caused by big real appreciation. The modest increase in the product wage helps to explain the rapid growth in employment over the period. In this sense it had a favourable impact not only on employment in the Non-tradables Sector but even presumably to some extent in the Lagging Sector, thus moderating the negative Dutch Disease effect<sup>6</sup>.

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<sup>6</sup> See also Lowe (2011), which confirms the big rise in the real consumption wage relative to the real product wage. But it also shows that the small change in the average real product wage hides differential movements within sectors of the economy. The real product wage in mining fell sharply (owing to the big price rises of mining products), while the real product wage in a broader category that includes manufacturing did rise well above the average.

Can one say that there is a national or Australian community gain or loss? There is a gain in two senses. First, there is a potential gain for the whole community through the increase in tax revenue coming from the Booming Sector – at least provided that the money is wisely spent by the government. Secondly, one could argue that in the (Pareto) compensating sense there is a national gain when the gainers from the boom are potentially able to compensate the losers, the latter being primarily in the Lagging Sector. But since full compensation never takes place, there will always be some losers, and that – to repeat – is the Dutch Disease problem<sup>7</sup>.

## II. POLICY OPTIONS

I now discuss three possible policies to deal with the Dutch Disease problem.

### 1. Do Nothing

One obvious policy is to allow the Dutch Disease to happen and for policy makers to resist pressures to “do something”. The real exchange rate appreciation is an inevitable consequence of the terms of trade boom and the capital inflow, both of which have benefits. In time capital inflow into the mining industry is likely to slacken off, even if the terms of trade improvement remains<sup>8</sup>. Some industries rise and some decline, and some declines, in any case, may be temporary. The government can help in the adjustment process, but should not try and stop or slow up adjustment. The economy needs to be flexible, and in the past has been. This is one point of view, though it may not be politically attractive<sup>9</sup>.

It must be added that this does not mean that the government literally “does nothing”. It does nothing *to slow up or prevent the decline* of particular firms or industries

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<sup>7</sup> Not many Australians, especially historians, would agree that our resource booms – of which the current one is the biggest – have been “curses”, but the Dutch Disease effect is the obvious negative effect. In some developing countries there have indeed been noticeable adverse effects of resource booms, or just resource discoveries. There is a huge literature about the “resources curse”, comprehensively surveyed in van der Ploeg (2011).

<sup>8</sup> The immediate prospect is a growth in capital inflow primarily for LNG development.

<sup>9</sup> A comprehensive statement of “the opportunities and challenges of an economy in transition”, given the mining boom – and spelling out this kind of approach – is in Australian Treasury (2011).

adversely affected by the Dutch Disease. But it can contribute to foster the flexibility of the economy, to improve above all the skills of the labour force, remove obstacles to people moving their homes, temporarily assist losers, provide information, improve the infrastructure, and indeed carry out efficiently and economically the basic duties of government.

## **2. Piecemeal Protectionism**

I come now to a policy, or group of policies, that are highly undesirable and, in particular, are based on questionable economic thinking. Of the various groups of industries adversely affected by Dutch Disease it is manufacturing, or perhaps particular manufacturing industries, or even firms, that are usually selected for deserving special assistance, whether in the form of subsidies or import tariffs. One reason is that manufacturing has been in steady decline, as measured by relative output or, even more, by relative employment. A shift from manufacturing to services has been a worldwide trend in advanced economies. In Australia a role has also been played by tariff reductions. Over a period of more than twenty years Australia has been transformed from a high tariff to a low tariff country.

The arguments against piecemeal protection, as this policy was once practised, are well known. How can a government or official authority “pick winners” as compared with the decentralised decisions of many entrepreneurs and managers? How can a government judge which industries have good future prospects justifying special help? Furthermore, uneven protection is inefficient and, most important of all, strengthens the power of interest groups.

If protection of particular industries is urged because of the adverse effects of the Dutch Disease there is one aspect that is crucial, namely the general equilibrium effects. This aspect is usually overlooked.

Suppose extra protection is provided for the motorcar industry. This reduces imports of motorcars, as is intended by the protectionist policy. But, given capital inflows and other factors, the lower imports will lead to extra appreciation of the exchange rate. If all manufacturing industries were significantly protected there would be a substantial

appreciation, which would worsen the Dutch Disease effects on other Lagging Sector industries, notably agriculture, tourism and education exports. Similarly, protection for selected manufacturing industries would have adverse Dutch Disease effects on other, less protected Lagging Sector industries, including unprotected manufacturing. These losers would thus suffer not only from the effects of the mining boom but also from the political success of their industry colleagues in extracting protectionist measures from the government. Furthermore, piecemeal protectionism creates distortions within the broader Lagging Sector.

Recently it has been suggested that the mining industry should be required to source various supplies or services domestically rather than importing or ‘outsourcing’ them. A similar requirement might be imposed on government spending and on private suppliers to the government. Such requirements would also lead to greater exchange rate appreciation than otherwise. It would thus benefit some industries and workers and through the Dutch Disease effect would damage others. In addition, it would impose an extra cost on the mining industry and on the government both of which would be compelled to source their supplies less efficiently than otherwise. It is a particular kind of piecemeal protectionism.

Finally, the basic argument for special assistance to the Australian motor car industry has been put by Federal Minister Kim Carr. This industry has a long history of protection in Australia, and its international prospects do not look good. But the argument is persuasive. “What we seek to do is to preserve the capabilities in the bad times, so that we can expand when conditions improve.” (Carr, 2012). There are just two problems. Firstly, the same argument can be put for other industries that have suffered from the Dutch Disease. Why pick motor cars? And secondly, there is the adverse general equilibrium effect on other Dutch Disease industries, just discussed.

Possibly one might make an argument for a policy package that provides equal non-discriminatory assistance for all the Dutch Disease losers. This is the third policy option, to which I now turn.

### **3. Fiscal Surplus combined with lower Interest Rate**

The third alternative would be a particular macroeconomic policy package. A fiscal surplus would be generated by tax and expenditure changes. Relative to the simple boom outcome (without a fiscal surplus) this would reduce demand for domestic goods and services, and so, on its own, would be deflationary. The reduction in demand then requires a counteracting monetary expansion by the RBA designed to maintain internal balance. The domestic interest rate would fall, and that, in turn, would lead to some depreciation of the exchange rate resulting from capital outflow encouraged by the lower domestic interest rate relative to the relevant foreign interest rates. Also, capital inflow would decline.

Thus the moderation of the initial Dutch Disease effect would be achieved, but at the cost of politically difficult tax and expenditure changes leading to a fiscal surplus.

This policy package would benefit firms in the tradable sectors of the economy (and especially the Lagging Sector) not selectively but in a uniform way, differing in this respect from piecemeal protectionism. It would be more efficient than piecemeal protectionism. Probably the strongest argument in favour of such a policy is that its success in reducing the Dutch Disease effect might weaken political pressures for piecemeal protectionism.

In an earlier version of this paper (Corden, 2011) I assumed that the fiscal surplus would or might be generated by adequate taxation of the mining sector, which is the source of the Dutch Disease problem. But, unexpectedly I have discovered a weakness in this argument, discussed in section II.5 below. Hence I assume here that the surplus is *not* generated by direct taxation of the mining sector, but rather by increases in taxes or reductions in government expenditures that reduce Australians' domestic spending more generally.

The moderation of exchange rate appreciation and thus of the Dutch Disease effect is in this case a by-product of a policy where the government saved some of the gains from the boom, though not by actually taxing the Booming Sector. Of course, this

does *not* mean that there should not be taxation of mining. I come back to this in section II.5.

#### **4. Exchange Rate Protection: Its Costs and Benefits**

The “fiscal surplus plus lower interest rate” proposal is really just a special case of a more general type of policy designed to moderate the Dutch Disease effect of the mining boom. We have here a special kind of protection – one that is designed to benefit all Lagging Sector industries evenly by moderating the exchange rate appreciation that is brought about by the boom, a boom that is caused by improved terms of trade and higher capital inflow. This is “exchange rate protection”.<sup>10</sup>

Any policy that reduces net capital inflow either by reducing gross inflows or increasing capital outflows will depreciate the exchange rate – or moderate an appreciation that would otherwise have taken place. Such an “exchange rate protection” policy will thus moderate or even avoid Dutch Disease effects.

Let us list some possibilities. Controls or taxes might be imposed on capital inflows (as is often discussed internationally). These controls or taxes might be imposed only on short-term capital imports or only on capital flows into the Booming Sector. Finally, private capital outflows might be encouraged, perhaps through superannuation regulations or tax concessions. In all cases there is less capital investment at home whether by foreigners, by private domestic agents or by the government.

What are the effects?

Firstly, in all cases some Australian industries – for example, those that would benefit from infrastructure investment – lose as a result of the fiscal surplus and others – in the Lagging Sector – gain. There is thus a redistribution of income between firms, industries and, indeed, Australians more generally. Some jobs will be lost and others gained.

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<sup>10</sup> See Corden (1985).

Secondly, it follows that measures to moderate or avoid Dutch Disease impose costs in the form of possible underinvestment at home. Indeed many people may find it counterintuitive that there should be a deliberate policy of discouragement of investing at home relative to abroad. Depending on the potential returns to Australia as a whole from investment at home versus investment abroad, if at the margin in order to reduce the Dutch Disease effect low-return foreign investment is favoured over higher return home investment (perhaps allowing for various externalities), then all these policies can be said to give rise to a “cost of protection”. Basically it is the cost of protecting all tradable industries (above all, those in the Lagging Sector) relative to non-tradable producing industries.

## **5. A Sovereign Wealth Fund?**

It is desirable that the proceeds of the fiscal surplus are not used in a way that will increase aggregate demand for domestic goods and services, hence partially or even wholly negating the initial deflationary effects of the surplus described above. Thus it can be argued that the proceeds should not finance investment at home. They should be used to buy back debt held abroad. And when all such debt has been bought back – or even before it has been – the proceeds might go into a Sovereign Wealth Fund (SWF) that invests its funds wholly abroad.

There are two other advantages of a SWF (when combined with a fiscal surplus and associated interest rate adjustment). Firstly, it is a form of national savings, and thus provides for future adverse events, especially the end of the mining boom. This is the argument from prudence<sup>11</sup>. Whether this is appropriate or needed, given private savings, is a matter of judgement. Indeed, some would argue that there is no need for governments to save; the savings decisions should be left to the private sector.

Here I should note that Australia’s Future Fund is also a form of prudent government saving. This fund invests about 80% at home and 20% internationally. I come back to

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<sup>11</sup> Cleary (2011) has advocated a SWF, using essentially the argument from prudence. A SWF has also been suggested by others, inspired by the Norwegian example. The concept has been discussed critically by two secretaries of the Australian Treasury. See Henry (2010) and Parkinson (2011).

the Future Fund at the end of this paper, in section III.3. In this section I also look further at the matter of the substitutability of domestic and foreign assets, which raises the issue of whether a SWF (that invests wholly abroad) is really necessary.

Secondly, by investing abroad rather than at home the SWF gives Australians an internationally diversified nest egg. There are risks that might apply specifically to Australian investments relative to international investments as a whole. I have in mind here, for example, specific adverse effects of global warming on Australia, or of regional political or economic disturbances. It is also possible that mining industry prices and hence profits decline because of new competitive producers emerging in other countries. The fund would then automatically reduce its new international investments, and might repatriate earlier investments to compensate for the loss of Australian government revenues.

Of course, individual Australians are free to save and also to diversify their investments internationally, whether through superannuation or other investments. But my main argument in this paper is primarily concerned with the by-product of the policy of fiscal surplus and interest rate reduction, namely that it is a way in which the government can bring about some moderation of Dutch Disease effects without discriminating between different Lagging Sector industries<sup>12</sup>.

## **5. Taxation of the Mining Sector: A Surprising Result**

One might think that there is surely a case for tying both national saving and its international diversification directly to income from the source of the possible uncertainty, i.e. the mining boom, through funding the fiscal surplus and hence the SWF by taxation of the mining sector. The brief answer is “Yes”. But the surprising qualification is that such a tie-up might not greatly reduce the Dutch Disease effect.

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<sup>12</sup> There is a complication I should note here. Capital outflow by the SWF would tend to some depreciation of the exchange rate, but it is the decline in the domestic interest rate determined by RBA policy (aiming at internal balance) that is critical in yielding the necessary exchange rate outcome of the combination of boom and fiscal surplus.



The issue is then whether a fiscal surplus-plus-SWF financed by taxation of profits of the mining sector would contribute to reducing the Dutch Disease effect by moderating appreciation. It can be shown that it would *not* do so, at least not significantly, depending on the extent of foreign ownership of the sector. This does *not* mean that one should not tax the mining sector and put the proceeds in a SWF. But one should not expect this particular policy package to make a major contribution to dealing with the Dutch Disease problem.

Let us consider a special case. Suppose the mining sector were wholly foreign-owned. Up to some upper limit, taxation of it would be borne wholly by a reduction of after-tax profits, and hence by dividends paid to foreigners<sup>13</sup>. These profits have then been pure rents, so that taxation has not changed the industry's output and hence demand for domestic goods and services (and hence the Spending Effect). The tax revenue then finances a fiscal surplus, and this surplus is paid into a SWF. What is the net effect?

Foreign owners of the industry spend less abroad, the result of having received lower dividends, and the SWF invests more abroad. The taxation and the use of the SWF may well be justified: Australians get a bigger share of the benefits of the boom, and, prudently, their government saves it and invests it abroad. But, this is the important point: in this case there is no effect on Australia's exchange rate.

In the Australian mining industry case a rough estimate by Connolly and Orsmond, 2011, p.143 (on the basis of limited data available to them) suggests that about four-fifths may be foreign-owned<sup>14</sup>. Given that estimate, this hypothetical story would not be far from reality. I emphasize here *given that estimate*. If the proportion of foreign ownership were much less then the following argument would *not* apply. But, assuming this high proportion, to make an impact on Australia's Dutch Disease by reducing the Spending Effect it would be necessary to have a rate of taxation on the

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<sup>13</sup> I assume here that these dividends are not reinvested in Australia. They are spent abroad.

<sup>14</sup> Commenting on this estimate Vince FitzGerald has suggested that foreign ownership is more likely to be lower than four-fifths, than higher, based on his estimate of 44% Australian resident ownership of BHP Billiton Limited plus BHP Billiton PLC, using data from several public sources, and broader guesstimates for other major iron ore, coal mining and LNG companies.

mining sector at a level that significantly reduced not just after-tax profits but output of the industry, hence the Spending Effect, and hence reduced the benefits of the boom<sup>15</sup>. One would indeed be “killing the goose”.

There is a way of bringing about a significant decline in the Dutch Disease effect – i.e. a significant depreciation of the exchange rate so as to moderate the appreciation caused by the boom – without “killing the goose”. As explained above, it would involve generating a sufficient fiscal surplus not primarily through taxing the Booming Sector but through increases in taxes or reduction in government expenditures that reduce Australian spending more generally. This is certainly possible. Various generous tax reductions or concessions, and expenditure commitments, provided by governments, both Coalition and Labor, in the good times since about 1996 (when the Coalition took office) could be reversed. This could generate a significant fiscal surplus that would then feed a SWF. This would indeed reduce the Spending Effect. But I need not spell out the political difficulties of such a policy.

The appropriate rate of tax on mining is a separate issue. It has to be borne in mind that, even when mining is subject to the same rates of company tax as other industries in Australia, the mining boom is generating higher tax revenue that could then finance a SWF. It would be hard to argue that existing taxes in recent boom conditions have been too high (“killing the goose that lays the golden eggs”), but taxes, including royalties, could certainly be too low for well-known political economy reasons<sup>16</sup>.

## **6. Macroeconomic Stabilization**

In spite of the costs of exchange rate protection one can make a case for the third policy option of “fiscal surplus plus lower interest rate”. This policy is not concerned with whether particular industries or activities should be assisted, but rather with a

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<sup>15</sup> Reducing output of the mining industry as well as investment by it might lower domestic demand (i.e. the Spending Effect) by about half the value of these reductions. This is based on rough estimates in Connolly and Orsmond (2011).

<sup>16</sup> I have in mind here the ability of interested and wealthy companies and private individuals to influence the political process determining tax rates. This is certainly not unique to Australia.

form of macroeconomic stabilization, namely approximate stabilization over time of the real exchange rate.

If there is a reasonable probability that the resources boom will not go on forever then one must prepare for a possible or likely downturn. This might justify smoothing policies over time by the government. In the boom the government would – as outlined above – run a fiscal surplus and feed the fruits into the SWF while in the slump it would run a deficit, financing it from the earlier returns and the savings of the fund. In all cases the RBA would pursue an internal balance monetary policy.

The changing time pattern of government saving and spending would then smooth the real exchange rate over time. I assume here that increased tax revenue in the boom period would not come mainly from taxes on foreign owners of Australian-based enterprises, including mining. The exchange rate would appreciate less in the boom and depreciate less in the slump as a result of this policy package. In the boom period (like now) the Dutch Disease effect would be moderated by a fiscal surplus, and in the slump period the need for declines in real consumption wages would similarly be moderated by a fiscal deficit. In both periods the losers would lose less and the gainers would gain less.

This policy would be in tune with the government's and the central bank's normal roles of macroeconomic stabilization, though it must be distinguished from conventional short-term stabilization of aggregate demand.

### **III. THREE COMPLICATIONS**

#### **1. Can the Non-tradable Sector be distinguished from the Lagging Sector?**

It is really an over-simplification to clearly distinguish the Non-tradable Sector and the Lagging Sector. The neat theoretical model with which I started turns out to have some problems when one looks at industries and economic activities in detail. It may not always be clear which are the losers from appreciation of the exchange rate and hence the “victims” of Dutch Disease.

A domestically produced product that depends on domestic demand and supply may also be an imperfect substitute for imports, and thus also depend on world prices and the exchange rate. It may then benefit from the domestic demand expansion resulting from the boom, but also lose from the associated appreciation.

I suspect that this could be quite common in manufacturing. Perhaps the best examples come from the building and construction industry that generates a big demand for various manufactures. Many of these are importable, but with significant transport costs, and where made-to-measure requirements advantage local suppliers over overseas ones.

And what about retailing? One might think of that as the non-tradable service par excellence. A store that sells imported goods will benefit from a boom in two ways, both through the favourable demand effect and through the exchange rate appreciation. But then we must allow for a radical new development, namely the increasing use of the internet in by-passing local retailers. Now the service is tradable, and to some extent has entered the Lagging Sector, though so far not with regard to all forms of retailing.

Coming back to manufacturing we can certainly conceive of a firm that produces two groups of products. One group produces non-tradables, the prices of which are determined by domestic demand and supply and a second group where the prices are closely determined by international prices converted at the current exchange rate<sup>17</sup>.

Then there is the tertiary education industry. Its income comes partly from the government and local students, and partly from foreign students. The boom is likely to raise the first category of income and, through the Dutch Disease effect lower the second.

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<sup>17</sup> Usually much emphasis is placed on the adverse effect of Dutch Disease in Australia on manufacturing. Here it should be borne in mind that manufacturing is now in Australia quite a small employer of labour. Taking average figures by decades, in the 1960s manufacturing employed 26% of the workforce, but by the 2000s it was down to 11% (with services at 72%). See Connolly and Lewis (2010).

Similarly a boom would probably raise the income of the local tourist industry derived from domestic residents, while having the usual adverse Dutch Disease effect on demand from foreign tourists<sup>18</sup>.

Insofar as these examples are representative of the larger economy (and far more empirical research is needed here) one might conclude that Dutch Disease is not a major problem, and thus the “do nothing” policy option should be preferred.

## **2. Resource Movement Effect**

The theoretical articles on Dutch Disease distinguish between the Spending Effect and the Resource Movement Effect. All the discussion so far in this paper has concerned the Spending Effect.

The Resource Movement Effect deals with the effect of the Booming Sector attracting labour and capital from the other two sectors, and so disadvantaging the Lagging Sector, and doing so even *at a given real exchange rate*. With the Booming Sector becoming more profitable it will attract labour directly from the Lagging Sector even at the initial exchange rate. This will reduce output and profitability in the Lagging Sector and is distinct from the Spending Effect (which works through the real exchange rate). The Resource Movement Effect reflects the common view that the mining boom has created a shortage of skilled labour in other sectors.

In addition, the Booming Sector is likely to attract labour from the Non-tradable Sector. In that case this has to be set against the increased demand for the products of that sector owing to the boom. On balance the increase in demand for non-tradables could be less than the reduction in supply caused by the outflow of labour, in which case their prices would rise or monetary policy would become more contractionary, involving a rise in the interest rate. In turn a rise in the interest rate would attract capital inflow, hence appreciate the exchange rate, and thus increase the adverse

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<sup>18</sup> In addition, more local tourists travel abroad rather than at home as a result of the appreciation. The increase in overseas travel by Australian residents has been very noticeable, but one can assume that there has been some benefit to local tourism from the increase in consumption real wages referred to earlier.

Dutch Disease effect on the Lagging Sector, leading to further reduction in output in that sector.

The general point is that for two reasons the Resource Movement Effect of a boom would reduce output, or might reduce output, of the Lagging Sector (in addition to the Spending Effect that operates through real exchange rate appreciation). These effects might also operate through the movement of new capital between sectors.

I have not pursued this Resource Movement Effect further in this paper because I judge that it is not particularly significant in Australia. There are three reasons.

The first is that the movement of labour between sectors is somewhat reduced by Australia's immigration policy, which readily allows skilled immigration, that can go directly from overseas into the Booming Sector.

The second is that the mining sector employs very little labour relative to the total Australian labour force. In 2010 it employed only 1.7% of total Australian employment, to which one should add 0.25% for mining related construction workers, i.e. investment in mining<sup>19</sup> Incidentally, this also explains why the boom has not led to significant real (product) wage increases in the rest of the economy<sup>20</sup>.

The third is that the movement of capital between sectors is similarly reduced by high international capital mobility. Resource sector investment reached 4.8% of GDP in 2011 but there has been no sign of crowding out of other private investment. "Up to 2010–11 higher resource investment has added to the total level of investment in Australia, with no signs of substitution or displacement. Rather, there are signs that the resource investment may have for some time stimulated complementary or supporting investment, by both the public and private sectors." (Gregory and Sheehan, 2011).

Of course, changes in relative outputs (and hence inputs of capital and labour) do respond to the original causes of the mining boom and then are affected by the

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<sup>19</sup> These figures come from Connolly and Orsmond (2011)

<sup>20</sup> But see footnote 7.

Spending Effect and its indirect consequences on the exchange rate, as described earlier. But direct movements at initial prices and exchange rates are likely to be modest.

### **3. Should Government Savings be invested at Home or Abroad?**

There is a fairly complex issue that I put aside in the earlier discussion of the SWF<sup>21</sup>. The Australian government's Future Fund invests primarily at home. As noted earlier, at present about 80% of its funds are invested at home and 20% abroad<sup>22</sup>. By contrast the SWF would invest wholly abroad, following the models of other SWFs, notably those of Norway and Chile. I am concerned here not with the expected profitability (discounted for risk) of various investments that might be made by the two funds but the implications for the objective of modifying the Dutch Disease effect of the resources boom. What are the implications for the exchange rate of investing a given fiscal surplus at home rather than abroad?

If it were invested abroad it would not have a significant effect on international rates of return. But if it were invested at home, what then? Let me assume for the moment that domestic rates of return are quite independent of international rates (for equivalent investments). Then required rates of return will fall when the Future Fund buys Australian assets. The extra funds available will lead to an increase in private investment at home. This will offset, at least partially, the reduction in aggregate demand resulting from the fiscal surplus.

Thus less monetary expansion will be required to maintain internal balance, and hence there will be less exchange rate depreciation brought about by monetary expansion – i.e. less modification of the appreciation that resulted initially from the boom. On this basis I have concluded that – if the objective of the fiscal surplus combined with the investment of the surplus is to moderate the Dutch Disease effect of the boom – it is better to invest abroad than at home, and thus to prefer a SWF to the Future Fund.

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<sup>21</sup> I am particularly indebted here to extensive discussions with Phil Garton.

<sup>22</sup> “The Future Fund was established in 2006 to assist future Australian governments meet the cost of public sector superannuation liabilities by delivering investment returns on contributions to the Fund”. See <http://www.futurefund.gov.au>. Its total assets at the end of September 2011 were \$A 73.18b (which was 5.1 % of GDP).

But there is a complication, and that is why I am keeping this topic to the end of this paper. Domestic financial assets – the returns of which have declined – are (probably) not perfect substitutes for international assets, but there is some degree of substitution. Markets will wish to maintain a portfolio balance. So there will be some capital outflow to bring Australian returns closer to the higher foreign returns. And this outflow will partially offset the inflow brought about by the Future Fund.

If foreign and Australian assets were perfect substitutes then the Future Fund would have no effect on rates of return in Australia in the same way as the SWF has no effect on rates of return internationally. It would then not matter whether the fiscal surplus were invested abroad (through the SWF) or at home (through the Future Fund). One could then conclude that the fiscal surplus should simply be invested with the objective of maximising returns, discounted for risk, whether at home or abroad. However it is invested, the creating of the surplus itself will have a deflationary effect, and that will then require a monetary expansion (for the sake of internal balance) that will bring about the desired modification of the initial appreciation caused by the boom.

It seems a reasonable judgement that foreign and domestic assets are *not* perfect substitutes, so that there remains a case for setting up a SWF in addition to the existing Future Fund, when one objective is to moderate the real appreciation effect of the resources boom. But if the degree of substitutability is very high the case is surely rather weak. A fiscal surplus associated with an “internal balance” monetary policy will moderate the Dutch Disease effect even when the funds made available by the fiscal surplus go wholly to finance private investment at home.

#### **IV. CONCLUSION**

##### **1. What are the principal Conclusions of this Paper?**

1. The difficulties created for various firms and industries by the Dutch Disease effect of the resources boom are well-known. But there are two qualifications that might lead one to the “do nothing” policy conclusion, i.e. to just let the



market work. The first is the positive side of the Dutch Disease (or real appreciation) effect, namely the substantial rise in real consumption wages owing to the fall in import prices (section I.4). The second is that some firms and industries may both lose from some Dutch Disease effect and gain from the boom generated by increased demand for non-tradables (section III.1).

2. The main objection to piecemeal protectionism is the general equilibrium effect. Protecting one industry affected by the Dutch Disease will increase the adverse effect on others in the Lagging Sector (section II.2).
3. A policy package of fiscal surplus combined with an “internal balance” monetary policy will moderate the real appreciation and hence Dutch Disease effect. This result will be non-discriminatory between industries and hence preferable to piecemeal protectionism (section II.3). But there will still be a cost of protection (section II.4)
4. While adequate taxation of the mining sector will be desirable (an issue not discussed in this paper), if a fiscal surplus is achieved by primarily taxing this sector’s profits, the policy package above may not significantly affect the exchange rate and hence the Dutch Disease. This is because the sector may be largely foreign-owned. If it is not, then this qualification does not apply. (section II.5).
5. Some intertemporal stabilization (or smoothing over time) of the real exchange rate would moderate the Dutch Disease in the resources boom period, and moderate the opposite effects (including declines in real consumption wages) in the slump period. This smoothing could be brought about by appropriate changes in fiscal policy associated with internal balance monetary policy (section II.6).

## **2. Yes, Professor, but what do you recommend?**

The second policy option, of piecemeal protectionism, is understandably politically attractive, but I do not recommend it, especially if we are concerned with the national

rather than just sectional or political interests. Thus, some combination of the first and third options would, in my view, be best. Much of this paper has been concerned with analysing in detail the third option – fiscal surplus with low interest rate and, possibly a SWF.

Focusing on this third option, significant fiscal surpluses are hard to obtain for obvious political reasons. But they could moderate the Dutch Disease effects in a relatively non-discriminatory way, at least for a transitional period. One might even consider it as a long-term stabilizing macroeconomic policy, as set out in section II.6.

The key point is that the only way in which governments and central banks can significantly depreciate the exchange rate is through monetary policy – i.e. reducing interest rates – and if inflation is to be avoided reduced interest rates need normally to be associated with appropriately contractionary fiscal policy. Whether such a policy package of fiscal contraction and monetary expansion is desirable depends on the balance of considerations expounded in this paper. Inevitably there would be both gainers and losers, or in the popular journalistic language, job gains and job losses. Indeed, to reduce the burden on Dutch Disease losers, new losers would be created. Yet this must be seen in the context of the resources boom yielding a net aggregate gain for the people of Australia, at least provided taxation of the resources sector is adequate.

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