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An overview of the impact of the commodity price boom on the South African economy

Ryan Hawthorne
Reena Das Nair
Keith Bowen



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World Institute for Development
Economics Research



Development Policy Research Unit
School of Economics, University of Cape Town

**An overview of the impact of the commodity price boom on the South
African economy**

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Prepared by:

Ryan Hawthorne

Reena Das Nair

Keith Bowen

Johannesburg Economics

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1. Introduction

Between January 2002 and July 2005, the South African exchange rate has appreciated by more than 30 per cent. At the same time, there has been widespread news coverage of the decline in several manufacturing sectors, notably clothing and textiles. Over the same period, commodity prices have risen substantially. The gold price rose from an average of \$310 per ounce in 2002 to an average of \$436 in 2005. The platinum price rose from an average of \$541 per ounce to \$887 over the same period.

This has led some commentators to speculate that high commodity prices have led to the appreciation of the rand, and the subsequent lacklustre growth in output and decline in employment in the manufacturing sector, along the lines of a classic case of the ‘Dutch disease’, where an economy is harmed by commodity abundance. These commentators are concerned that once our manufacturing sectors are lost, we may not be able to rebuild them, and we will lose the dynamic benefits of having a manufacturing sector, which include skills accumulation and economies of agglomeration.

In this paper, we begin with a definition of what is meant by a commodity and what is meant by a manufactured good, and we describe the commodity price time series we use. We then provide an overview of the literature on the ‘Dutch disease’ effect, followed by an analysis of the impact of the commodity price boom on South Africa. Finally we present our conclusions, and some potential policy interventions emanating from the literature on Dutch Disease.

2. Methodology

Definition of commodity, manufacturing and service

We use a different definition of commodity and different definition of manufacturing and services in our analyses to the definitions employed by Statistics South Africa, the SA Reserve Bank, TIPS and other analysts of the impact of commodity prices. We define a commodity to be any product that is close to the bottom of the value chain, i.e. relatively un-beneficiated.

We do this for a number of reasons. The first is that many products that are not minerals themselves effectively embody significantly more minerals rather than anything else, and are thus traded in the same way as many minerals are traded. For instance, aluminium embodies mainly coal (through electricity) and alumina. In the same way that incentives to invest in human capital are limited in mineral commodities because of the rents to be earned in minerals production during a boom, so incentives to invest in skills to produce many partially beneficiated products are also limited, given that they too are subject to rents arising from high prices in a boom period, which are unrelated to the amount of effort they put in or skills they acquire¹.

¹ One of the key differences between minerals and partially beneficiated mineral products is the labour intensity of producing mineral products, and the capital intensity involved in producing partially beneficiated products. Arguably, partially beneficiated products are even less desirable for a labour

Partially benefited products also do not give rise to the same extent of externalities that products further down the value chain give rise to. For instance, car parts manufacturers located nearby car makers can share knowledge among themselves and with car assembly plants and can benefit from a pool of skills. However, having a stainless steel producer nearby has a relatively low impact the productivity of a pot manufacturer (pot manufacturers buy very standard round stainless steel discs and stainless steel manufacturers have relatively inflexible production processes in order to take advantage of economies of scale).

Thus we include base metals and basic chemicals in the commodity sector, and we define a sector called ‘other manufacturing’ to include all other manufacturing sectors further down the value chain. We include the services sector as a comparator, in part to check whether, as we would expect in a commodity price boom, the services (non-traded goods) sector is expanding at the expense of the manufacturing sector. We exclude electricity, gas and steam, and water supply from all three sectors defined here as they do not fall naturally into any of the three and there is very little loss to our analysis.

The products we include in the three broad sectors we define are shown in Table 1 below:

Table 1: Sectors included under commodities, other manufacturing and services

Commodities	Other manufacturing	Services
Agriculture, forestry and fishing	Beverages	Building construction
Basic chemicals	Electrical machinery and apparatus	Business services
Basic iron and steel	Food	Catering and accommodation services
Basic non-ferrous metals	Footwear	Civil engineering and other construction
Coal mining	Furniture	Communication
Coke and refined petroleum products	Glass and glass products	Finance and insurance
Gold and uranium ore mining	Leather and leather products	General government services
Non-metallic minerals	Machinery and equipment	Medical, dental and veterinary services
Other chemicals and man-made fibers	Metal products excluding machinery	Transport and storage
Paper and paper products	Motor vehicles, parts and accessories	Wholesale and retail trade
Wood and wood products	Other transport equipment	Other producers
Other mining	Other manufacturing	
	Plastic products	
	Printing, publishing and recorded media	
	Professional and scientific equipment	
	Rubber products	
	Television, radio and communication equipment	

intensive economy, as the exchange rate reflects the capital intensive nature of these products, at the expensive of exports of labour intensive products.

Commodities	Other manufacturing	Services
	Textiles	
	Tobacco	
	Wearing apparel	

Commodity price index

It is uncontroversial that commodities prices have risen substantially in recent years. All of the commodity price indices show substantial increases over the past three years in commodity prices overall (see Figure 1), these are generally muted when compared to the dramatic increases in platinum and coal prices. Platinum prices have risen by 131% from October 2001. This is important for the selection of an index for our analysis, as a substantial proportion of SA's exports is made up of platinum, gold and coal (see Table 2).

Table 2: The top five commodities exported by South Africa (using 4-digit HS codes) are weighted as:

Commodity	HS code	% of total exports
Platinum	7110	10.13
Gold	7108	9.53
Ferro-alloys	7202	6.26
Coal	2701	6.16
Diamonds	7102	4.56
Total		36.64

Source: TIPS, DTI, South African exports (January – July 2005)

We examined several different indices to check for a good match with SA's export profile, two of which are shown on Table 3. Platinum prices are a significant proportion of the CCI Precious Metals index, while gold and coal are a significant proportion of the RBA non-rural index. Of these, we selected the RBA non-rural index as most closely approximating South Africa's export profile. We checked that trends in gold and platinum prices roughly approximated the RBA index (see appendix 1).

Table 3: Weights of commodities in the RBA Non-rural commodity index

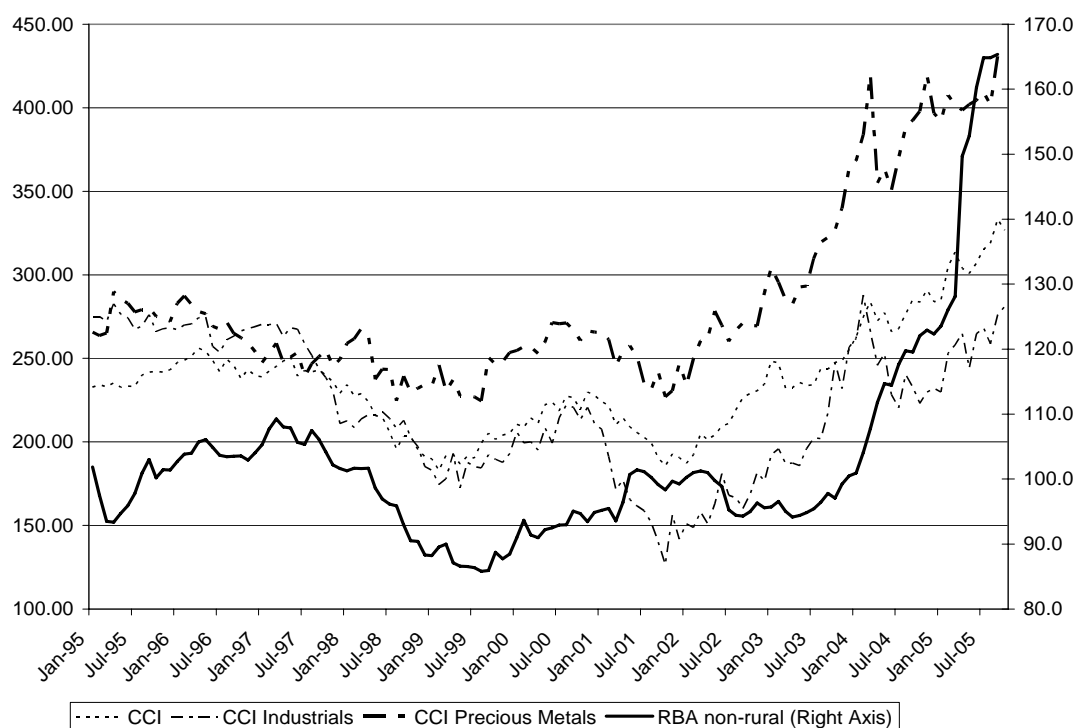
Weights in the RBA non-rural commodity index		Weights in the Reuters-CRB index (CCI)	
Base metals and other resources	Weighting (%)	Sector	Weighting (%)
Aluminium	11.4	Energy: Crude Oil, Heating Oil, Natural Gas	17.6
Copper	3.9	Grains and Oilseeds: Corn, Soybeans, Wheat	17.6
Nickel	3.7	Industrials: Copper, Cotton	11.8
Zinc	2.1	Livestock: Live Cattle, Lean Hogs	11.8
Lead	1.0	Precious Metals: Gold, Platinum, Silver	17.6

Weights in the RBA non-rural commodity index		Weights in the Reuters-CRB index (CCI)	
Base metals and other resources	Weighting (%)	Sector	Weighting (%)
Coking coal	20.7	Softs: Cocoa, Coffee, Orange Juice, Sugar	23.5
Steaming coal	13.7		
Gold	13.2		
Iron ore	13.1		
Alumina	10.4		
LNG	6.8		

Source: Reuters, Reserve Bank of Australia

Figure 1 below compares these various indices. The RBA Non-rural index reveals a dramatic rise in the past eighteen months predominantly lead by coal prices, which are a large component of the RBA index and fourth largest export of South Africa.

Figure 1: Different commodity price indices vs. the RBA index



Source: RBA, Reuters

3. The effects of a commodity price boom, and implications of different policy interventions

3.1. Relationship between resource abundance and economic growth

The observed negative relationship between resource abundance and economic growth seems paradoxical at first glance. One would expect countries that possess such resources to thrive and experience higher relative growth compared to their less-endowed counterparts. After all, such resources can be used to generate foreign exchange that is vital to finance investments, trade, imports and infrastructure, which in turn, should translate into greater employment in the resource rich sector and possibly, economic growth.

Yet, somewhat the opposite has been observed in developing countries with high natural resource endowments. Resource-intense countries such as Russia, Nigeria and Venezuela have not seen high growth, whereas countries like Singapore, Hong Kong, Japan and Switzerland, with their comparatively meager access to natural resources, have flourished economically (Papyrakis and Gerlagh, 2004). In fact, as observed by Gylfason (in his study of the effects of education on economic development), from 65 countries that can be considered to be resource-rich, only 4 (Botswana, Indonesia, Malaysia and Thailand) have succeeded in achieving and maintaining GNP growth above 4% per year on average from 1970 to 1998, as well as long term investment in excess of 25% of GDP over the same period. Nonetheless, those nations with fewer resources still outperformed these afore-mentioned 4 countries (Gylfason, 2000).

Indeed, numerous studies have attempted to explain why this ‘resource curse’ has plagued resource-endowed countries, especially in the African continent. ‘Dutch Disease’ (as this experience was named following poor economic performance of the Netherlands after the discovery of North Sea gas in the 1970’s) is thought to be a consequence of combinations of the below factors.

3.2. Factors contributing to the ‘Dutch disease’

When natural resources are exported, foreign currency received would increase its money supply when the exchange rate is fixed. Domestic prices would also be forced to rise due to rising demand pressure. This domestic currency appreciation is known as the currency appreciation effect.

Given a floating exchange rate, the higher foreign exchange supply would raise the relative domestic currency’s value also leading to the appreciation of the currency through increased nominal exchange rate.

Under both regimes, a loss of competitiveness of exportable manufactured goods leads to the diminishing of the nation’s traditional export sector. (Jourdan, 2005; Ebrahim-zadeh, 2003).

During a resource boom, factors of production tend to diffuse from the non-resource intense sector (e.g. manufacturing), into the resource- intense sector (e.g. commodities) and non-traded sector (e.g. services), following the greater rents to be earned in these as a result of higher demand. Hence, again the manufacturing sector

shrinks. This is known as the resource movement effect (Ebrahim-zadeh, 2003; Heeks, 1998). This presents a problem especially if manufacturing is the sector that exhibits greater increasing returns or produces more positive externalities in the economy when compared to other sectors. Manufacturing generally involves learning-by-doing that is non-firm specific and thus contributes to the human capital accumulation in the economy, and not just to the individual firm.

This results in the social rate of return from manufacturing being higher than the private rate of return. Hence the movement of factors from the manufacturing sector to resource and non-traded sectors could result in a decline of economic growth, if one were to assume that the above lack of skills spill-off is indeed the case. Further, increasing returns to scale may be experienced (following from the nature of the education production function) when further education results in increased productivity in the manufacturing sector but not in the non-traded sector. If resources move to these other sectors, then workers could choose to forgo this further education and continue to work in these sectors, since they currently generate more rents. This behaviour will carry forward into the future generations.

In contrast, in an economy that has low resource abundance, workers would move into manufacturing and would have a greater reason to invest in education as higher skilled workers would earn a premium over less skilled/educated workers in this sector. This would in turn, lead to more skilled teachers in the next generation. Again, this behavior will carry on into the future generations, each time creating a more highly skilled workforce than before (Warner and Sachs, 1997).

This viewpoint was reinforced by Gylfason in his study, where he showed that natural resources lead to a decline in economic growth through the weakening of incentives for human capital accumulation. In his regression analysis, he also makes the strong assumption that as a rule, natural-resource based industries are less high-skilled industries compared with others, where workers trained in them have less advanced generic labour-market skills. This leads to workers in these industries relaying fewer externalities or contributions to other industries in the economy. The exceptions of course, lie in advanced agriculture and modern mining industries, but in general, he assumes that primary industries like agriculture, forestry and fishing have relatively less skilled workers (Gylfason, 2000).

Then there are the more contentious political issues that scrutinize where and how the rents of these resource exports are invested.

Firstly, a trend in increased consumption is witnessed in such economies following a resource boom. The country engages in greater spending of the rents earned from resource export on non tradable goods and services (Jourdan, 2005). This increased spending in the domestic economy is termed the spending effect and leads to excess demand and consequently, a price increase in the non traded sector. The production of local traded goods becomes less profitable, leading to the shrinkage of this sector.

In addition, Government may engage in overspending that may eventually need to be financed by debt. For instance, in the elation of the boom, government may undertake costly projects that they may not be able to sustain once their advantage is reversed. This 'intertemporal allocation' choice is extended to the public if government restricts

its public from investing their wealth in foreign assets (Deaton, 1999). This was further investigated by Rodríguez and Sachs, who employed a Ramsey growth model to the workings of the Venezuelan economy. They argued that economies rich in natural resources are likely to live beyond their means and engage in inefficient spending (Neumayer, 2004). Furthermore, resource-rich nations may also be more vulnerable to corrupt rent-seeking behaviour that serves to distort allocation of resources and hamper growth (Bardhan, 1997- cited in Gylfason, 2000). This, fueled with lack of transparency on how the wealth is distributed, makes it very difficult for governments to alter the spending habits given a downturn in resource prices globally (Auty, 2001).

A related concern is that resource rich countries adopt policies that do not encourage enough savings, which in turn could be used to finance public investment (as opposed to financing current consumption). Atkinson and Hamilton in their study found that there was indeed a positive and significant relationship between genuine saving and growth rate of GDP per capita. Specifically, they found that a 10% increase in genuine saving ratio leads to a 0.3% increase in the growth rate of GDP per capita (Atkinson and Hamilton, 2003).

For those rents that are invested, the quantity, quality and sustainability of the investment in resource abundant countries has been questionable. Not adequately investing rents from resource depletion into future wealth creating endeavors e.g. in education and training and other such human resources development, leads to crowding out of human capital, entrepreneurship and innovation (Neumayer, 2004). Studies have indeed showed that school enrollment levels were negatively related to natural resource abundance. In fact in OPEC countries (obviously resource-endowed in oil), less than 4% of GNP was spent on education on average, compared with the worldwide average of 5% (for 1997) (Gylfason, 2000).

In an effort to be less dependent on natural resource exports (given the volatility aspect of commodity prices that will be discussed shortly), governments attempt to promote their local industry by employing protectionist methods. However, the approach is often misguided in that they employ quantitative methods such as quotas and tariffs on imports as a means of protecting domestic producers. This reduces economic welfare and social equity overall and offers little in terms of promoting exports of value added products (Bardhan, 1997- cited in Gylfason, 2000).

The effects above can, arguably, be seen to have been present in the oil producing countries following the 1970's price boom as well as in Columbia following the coffee price surges. Other countries that may have experienced symptoms of the Dutch Disease include Nigeria, Iran, Venezuela, Saudi Arabia and Qatar (Gylfason, 2000). In these economies, factors were thought to have been channeled into these resource-rich sectors and away from the manufacturing and other non traded goods sectors (Ebrahim-zadeh, 2003).

When an economy's export composition is predominantly resource-based, perhaps one of the most important issues to consider is the trend in the commodity prices of these resources. This determines the revenue that countries receive over time for the export of their commodities. In the African context, moreover, Deaton in his study showed a positive relationship between commodity price movements and growth.

Therefore it is of interest, at least in terms of planning on how to expend this income, that a country is able to monitor and understand the price trends of their commodities. These movements are generally extremely volatile but nonetheless, according to the Presbisch-Singer hypothesis, commodity prices fall in the long run when compared with the price of manufactures that are imported by the country that exports its commodity. This is due to the fact that the income elasticities of demand for primary products are lower than those for manufactures. Therefore, given an increase in income, the demand for manufactures grows faster than the demand for commodities. However, as pointed out by Deaton, the above theory is lacking in explanatory power. Arthur Lewis' idea that wages cannot grow when there are unlimited supplies of labour at the subsistence wage seems more feasible. When this is the situation, any developments that there maybe following technological progress in the commodity sector is accrued to consumers of the importing industrialized countries. Nonetheless, the general conclusion is that as long as there is abundant labour that are happy to work at the going wage rate, real prices of commodities will not rise (Deaton, 1999).

3.3. Is there any hope for commodity- rich countries?

Given that commodity prices are volatile, and the fact that resource rich countries possess these commodities which in the long run will experience declining prices, it seems inevitable that they would, in the presence of Dutch Disease and declining overall prices, experience lower economic growth if no measures are taken to stabilize the rents from resource exports.

There are success stories, however, in this otherwise gloomy picture. These may provide insights or offer advice for the many countries that export natural resources. It also highlights the importance of approaching potential Dutch Disease, not as an acute and untreatable disease, but rather, as a chronic one that can be 'managed' and one that can be 'tuned' to actually benefit the economy.

Norway is one of these stories. Given its global position as an oil producer, one would fear that it would face the resource curse at some stage. However, the policies that the Norwegian government has embarked on focus on development, not only for the current generation but also for the future generation. For example, they use the revenue earned from oil to invest in securities and education (university attendance increased from 26% to 62% between 1980 and 1997) (Gylfason, 2000). Canada, Sweden, Finland are other countries that have fared well given the resources they possess.

Botswana is a good example of an African country that has managed to minimize Dutch disease effects. The democracy showed high levels of transparency with its public spending and government accounts, as well as scoring well on the Corruption Perception Index of 2000. The government also attempted to sterilize the rents via means of a Revenue Stabilization Fund, Public Debt Service Fund as well as by having off shore investments. This way, they were prudent with the rents that they received from their resource- diamonds (Auty, 2001).

Potential policy interventions for commodity rich economies

A commodity price boom need not be a curse, provided that the rents from these resources are harnessed and invested in an efficient way. There are several areas in which the state can intervene to minimize the effects of Dutch Disease:

- If the commodity prices are currently favourable and the resulting wealth is deemed to be temporary, then artificially maintaining a weaker currency is one method to hinder the currency from appreciating. This can be done by holding greater reserves of foreign currency (i.e. selling domestic currency in return for foreign exchange) in order to keep the domestic currency value lower than it would without intervention. This can continue until the tides turn and the usual volatile commodity price cycle heads towards its downturn. However, this type of intervention calls for caution in its application. Increasing the supply of domestic currency can lead to inflation (Ebrahim-zadeh, 2003).
- If the windfall is seen as more permanent, then the state should engage in effecting behavioural changes in the economy. This can be via encouraging public investment and savings, and discouraging unnecessary spending/consumption. Regressions undertaken by Atkinson and Hamilton as we would expect, show that resource-rich countries whose governments engaged in high consumption, have on average, experienced lower economic growth. In fact, to take the argument a step further, they showed that governments that engaged in excessive current consumption fared significantly worse in terms of economic growth than those that used the windfall to finance public investment (Atkinson and Hamilton, 2003).
- Again, related to this is the promotion of higher savings to stimulate economic growth. Regression results show (as mentioned above) the positive relationship between genuine savings (measure of how much wealth countries are creating or liquidating) and the degree to which rents from resources are being invested to create growth in GDP (Atkinson and Hamilton, 2003). Given this, policy should aim at structuring transparent mechanisms or funds in which the nation's wealth from natural resources can be saved. Suggestions by Auty in his comparison study of Botswana's success (and Saudi Arabia's failure) in curbing the effects of the commodity price boom include setting up capital development fund (CDF- as a means to identify the capital component of the rents and sterilize the capital inflows); revenue stabilisation fund (MRSF- to buffer the revenue that are absorbed via public expenditure from price shocks); and project evaluation units to improve the efficiency of public sector investment (Auty, 2001).
- Another vital structural change in the economy is to stimulate productivity, especially in the non traded sector. This can be achieved through intense focus on education, training and development in human resources in skilled vocations. It has been shown that economic growth increases with education. Gylfason, has shown in his study of 86 countries, that a 40 percentage point increase in secondary-school enrolment was accompanied by a 1 percentage point rise in the annual rate of growth of GNP per capita (Gylfason, 2000).
- In order to promote local industry, other means should be employed, aside from import subsidizing industrialization via means of tariffs and quotas. Other international barriers also tend to limit developing countries from succeeding in producing and exporting higher valued manufacturing goods,

e.g. Anti-dumping protection, local subsidies in industrialised countries etc. Again, this could take the form of increasing productivity in local industry via means of increased education and training.

- In line with the above point, it would be beneficial to diversify the local export industry so as to reduce reliance on pure natural commodity exports. That is, via beneficiation into value added downstream industries, the export competitive edge can be streamlined closer towards the finished product than the raw material (Jourdan, 2005). However, this value addition development need not be directed at the downstream market only- lateral development can also be encouraged.

4. The impact of the commodity price boom on South Africa

4.1. Determinants /impediments of economic growth in South Africa

Before analysing the effects of high commodity prices in South Africa, we briefly review the determinants of economic growth in South Africa, in recognition of the fact that factors other than commodity prices may influence manufacturing output and unemployment. In a comprehensive analysis on growth absence in South Africa, Fedderke (unpublished) identifies several shortcomings that the SA economy faces which leads to diminishing growth.

Firstly, he stresses the important contribution of the accumulation of physical capital to long term economic growth. Investment in fixed capital in South Africa is falling, and this in turn leads to declined growth. He also stresses that uncertainties about the institutional frameworks have a large role to play in this and dampen the confidence to undertake such investments. These uncertainties also hinder capital flows into the country.

Secondly, there are several market distortions in capital, labour, trade and output markets. This calls for improvement in the microeconomic policy directions to improve efficiency in resource allocation. In relation to this, the high level of protectionism of certain industries is a competition concern, both domestically and globally. In particular, Fedderke emphasizes the distortions in the labour market (its inflexibility and pricing) as a major concern on the efficiency of the labour market.

Lastly, the poor quality of human capital investment in South Africa is also of great concern to growth prospects. The South African education system is poor in quality and costly to attend. This greatly limits the accumulation of productive human capital (Fedderke, 2004).

We now turn to the impact of high commodity prices on the SA economy, beginning with the impact on the exchange rate.

4.2. Determinants of the real exchange rate

It is relatively uncontroversial that the commodity prices have some impact on the South African exchange rate. For instance, the governor of the Reserve Bank, Tito Mboweni, explains that the recent changes in the exchange rate as follows:

‘The rand’s overall recovery since the lows of late 2001 can be mainly attributed to improved perceptions about South Africa’s economic fundamentals, US dollar weakness, rising commodity prices, positive interest rate differentials, and, of course, a recovery from heavily oversold levels’.²

The IMF broadly agrees with these conclusions. In a study on the determinants of the real exchange rate for South Africa, it was hypothesised that commodity prices played a significant role in driving the long-term equilibrium level of the real exchange rate. The cointegration test conducted in the study showed, as expected, a positive long-run relationship between real commodity prices³ and the real effective exchange rate (REER) of South Africa, with a one percent increase in real commodity prices associated to a half percent appreciation of the REER.

In addition the study identified a number of other determinants – some with an equally strong long-run impact on REER as commodity prices:

- Real interest rate differentials (with a 3 percent appreciation in the REER associated with an 1 percentage point increase in the real interest rate differential);
- Real per capita gross domestic product differentials (an increase of 1 percent in the real per capita GDP differential associated with an 0.1-0.2 appreciation of the REER);
- Openness of the economy (ratio of total imports and exports to GDP), where an increase of 1 percentage point in the openness ration is associated with an 1 percent depreciation of the REER;
- Ratio of fiscal balance to GDP (an 1 percent increase in the fiscal balance is associated with a depreciation of the REER of approximately 2 percent);
- Ratio of net foreign assets to GDP (an 1 percent increase in net foreign assets is associated with an appreciation of the REER of approximately 1 percent). (McDonald and Ricci, p. 16)

In so far as the real exchange rate of the Rand has increased in the past three years as much of this development can be associated with relatively high real interest rates as with the turn around in the commodity cycle. In a recent IMF country report for South Africa (Report No 05/346) it is argued that the Rand appreciation has been generally in keeping with the long-run equilibrium level (as determined by the above analysis) and that the higher commodity prices and increased net foreign assets have played a significant role in the appreciation.

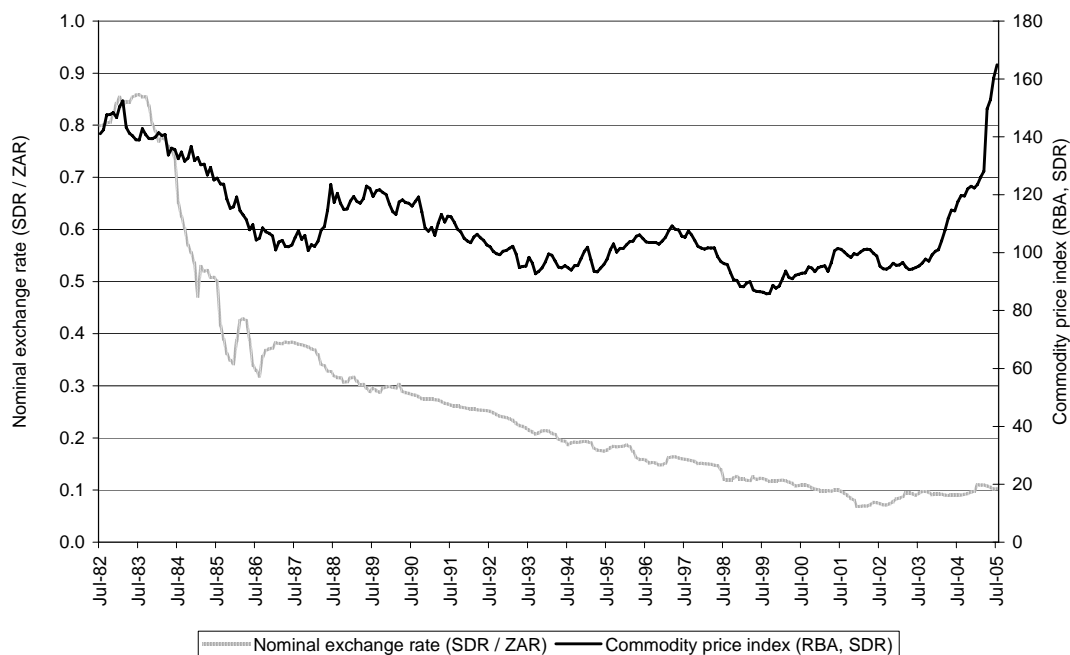
² Speech by Tito Mboweni at the LBMA Precious Metals Conference, Johannesburg, 14 November 2005;

³ The real commodity prices used in the study were based on the following weightings: Gold 71,0%; Coal 17,7%; Iron, 3,9%; Copper 3,8%; Platinum 3,6%

In a recent paper for the South African Reserve Bank, Kahn and Farrell argue that monetary policy plays a substantial role in determining the real interest rate differentials. In the recent experience of SARB seeking to establish credibility in terms of monetary policy – especially in shaping inflation expectations, and drawing these toward the inflation target – the tighter monetary policy (and consequently higher relative real interest rates) would have a direct effect on short-term capital flows and lead to an appreciation of the currency.

While commodity prices – especially for those that South Africa export – have increased, with an impact on the exchange rate, the high real domestic interest rates – themselves a direct response to the monetary policy regime – has played an important role in spurring the appreciation of the Rand. The relationship between the rand and commodity prices can be broadly seen Figure 2 below. Please note that in most of the data analyses in the sections that follow, we do not repeat the commodity price and exchange rate data described here.

Figure 2: SA exchange rate (SDR / ZAR against the commodity price index (RBA, SDR)



Source: SA Reserve Bank, Reserve Bank of Australia

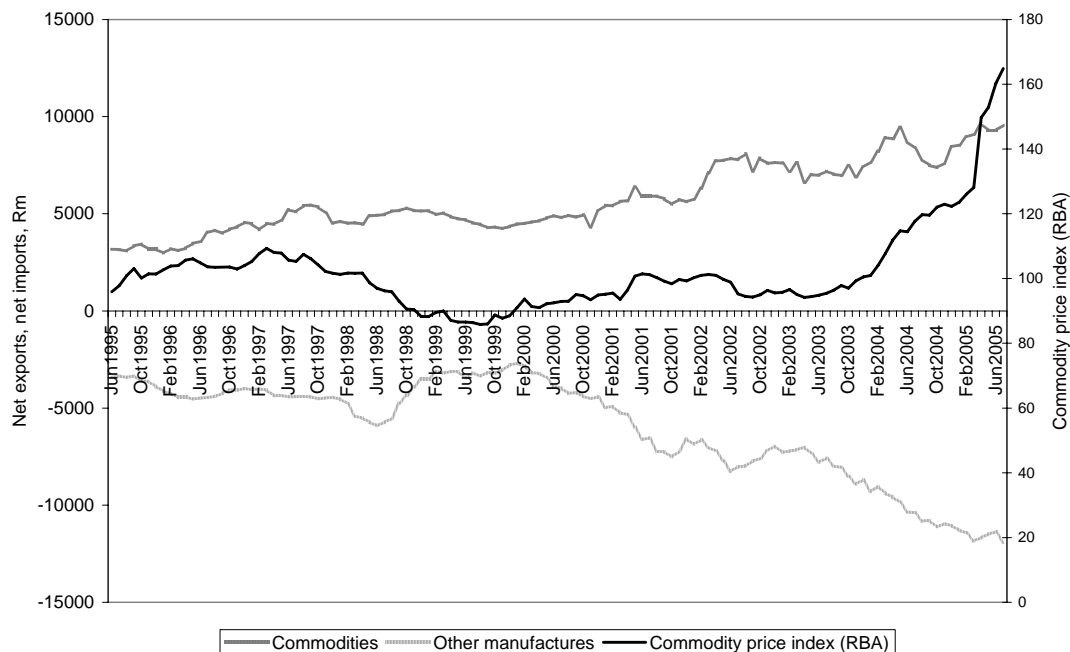
4.3. Net exports of commodities and other manufactures

Net exports (exports minus imports) of commodities have risen of late, after a substantial dip in 2004, while net exports of other manufactures have declined substantially (see Figure 3). These trends correspond with a sharp increase in commodity prices, and a substantially stronger exchange rate (see discussion in section 4.2 above).

More specifically, base metals and precious metals net exports have increased significantly (see appendix 2, Figure 9), while vehicle and machinery net exports have declined sharply (Appendix 2, Figure 10).

The commodity price boom has thus negatively impacted on the net exports of the manufacturing sector and has increased net exports of commodities. This is consistent with the predictions of the exchange rate effect of the Dutch disease phenomenon, described in section 3.1 above.

Figure 3: Net exports of commodities and other manufactures, against the RBA commodity price index



Source: TIPS data, Reserve Bank of Australia

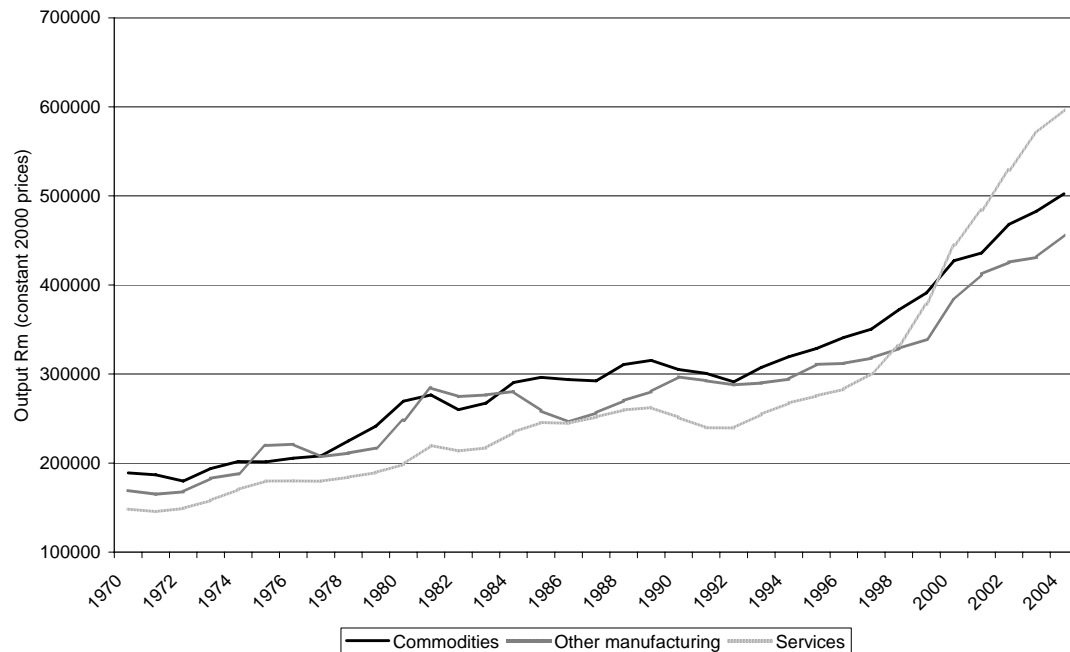
4.4. Output trends in commodities, other manufacturing and services

The SA economy has seen a substantial structural shift over the past 35 years from a largely commodities based economy in 1970 to a services based economy today (see Figure 4 below). Nevertheless, commodities still comprise a substantial proportion of SA output.

As commodity prices increase, mining output increases, although there has been some response by the currency (see discussion on commodity prices and exchange rates above in section 4.2), which appears to have muted the increase in output. Since commodity prices started to rise in 2003, SA has not seen as much of a decline in other manufacturing activities as one may have expected, nor has SA seen a dramatic increase in growth in services activities beyond the growth rates in services seen in the last ten years. We note that commodity prices have climbed significantly from their average in 2004 in the last year, and that these trends may change with new

output data (i.e. we may see a decline in manufacturing and a concomitant rise in services and commodities output).

Figure 4: Commodities, other manufacturing and services output



Source: TIPS data

It is important to note some of the nuances of the output data, described graphically more fully in appendix 3. Figure 12 in that appendix shows that a large proportion of other manufacturing output is made up of food and motor vehicles. Government intervention in at least the motor vehicles sector is substantial, with significant support offered to this sector (Flatters 2005). The food manufacturing sector is arguably somewhat protected from competition from imports, as it is a relatively low value to mass product (and transport costs as a proportion of selling price are therefore substantial), and so the currency appreciation effect of a commodity price boom does not affect the food manufacturing sector substantially. In goods that are readily tradable, such as the wearing apparel sector, however, there has been a marked decline in output since the beginning of 2003 (see Barnes 2004). In many other sectors, however, there has been no substantial decline in manufacturing.

The effects of the commodity price boom have been somewhat muted in South Africa by the decline in gold mining production for exogenous reasons relating to the depth at which ore grades are having to be mined (see Malherbe & Segal, 2000). This can be seen in appendix 3 on Figure 11. At the same time, platinum production has expanded significantly. The net effect of these expansions and contractions in mining has been somewhat neutral on the SA economy. However, both basic and other chemicals production, as well as iron and steel output, have increased dramatically, and have expanded substantially in response to relatively higher prices. At the same time, services output has expanded rapidly, particularly in the wholesale and retail trade, transport, and business services sectors (Figure 13).

Overall, there has been an expansion in commodities and services output, apparently at the expense of certain relatively un-protected tradable manufactures.

4.5. Movement of factors of production (capital and labour) in commodities, other manufacturing and services

Employment in the services sector has increased somewhat since 2002, while employment in commodities and manufacturing has been somewhat flat since 2002 (see Figure 5). In a commodities boom, we would have expected employment to substantially increase in the commodities and services sectors, largely at the expense of the other manufacturing sector⁴. Similarly, investment in services has seen a sharp increase in recent years, although commodities and other manufacturing have also seen something of an increase in investment (see Figure 6). Again, this is not what would be expected in a commodity price boom leading to the Dutch disease effect described in section 3.2.

The sector specific employment trends approximately follow the output trends described above (see appendix 4). While other mining (which we assume includes the platinum group metals PGMs) employment increases, gold employment declines substantially. We note that while food manufacturing sector output is growing strongly, employment has been declining. In the services sector, business services and wholesale and retail trade employment have been growing substantially (see Figure 16).

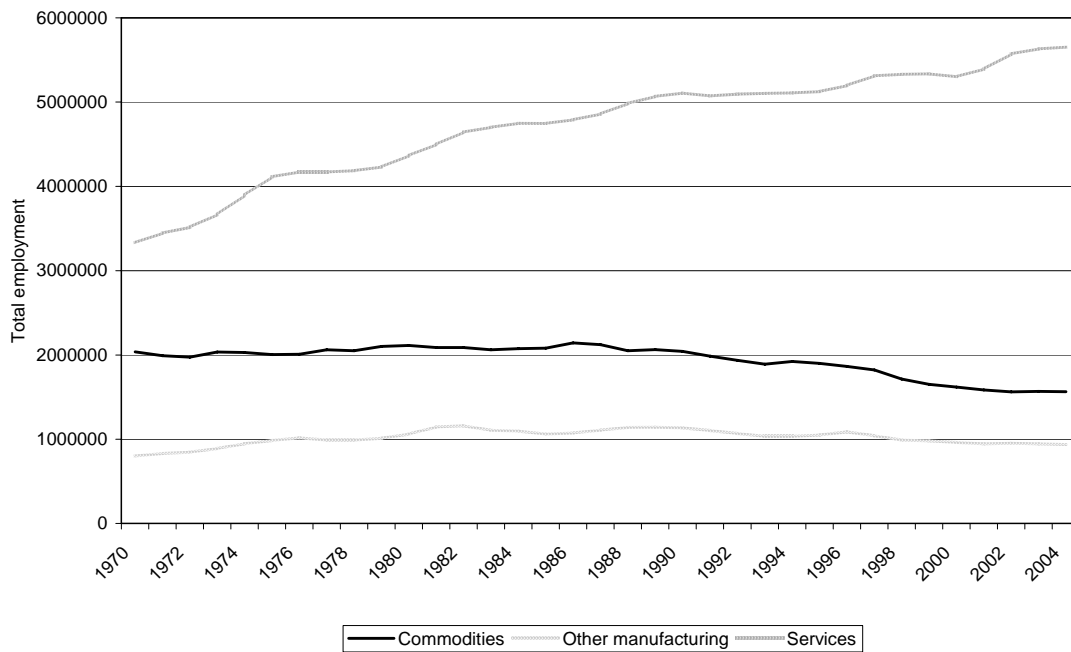
Sector specific investment trends are roughly similar (see appendix 5). While investment in other mining (which we assume includes PGMs) has been growing substantially, investment in gold mining has been stagnating (though not declining). Investment in basic chemicals has also been significant. Investment trends have followed output trends in other manufacturing too; for instance investment has been significant in the food and beverages sectors, as well as the motor vehicles sector, while investment has been largely stagnant in other sectors.

Communications, finance and insurance, business services, and government services have seen substantial investments.

Overall, employment in commodities and manufacturing have declined, the latter more slowly than the former. Employment in services has increased. Investment, on the other hand, has been increasing in all three sectors, although services sector investment has been increasing at the fastest rate. In the aggregate, therefore, South Africa has not seen a substantial shift of factors of production from the other manufacturing sector to the commodities and services sectors. Rather, it would seem that there has been an increase in the capital intensity of production methods. We discuss capital intensity trends in the next section.

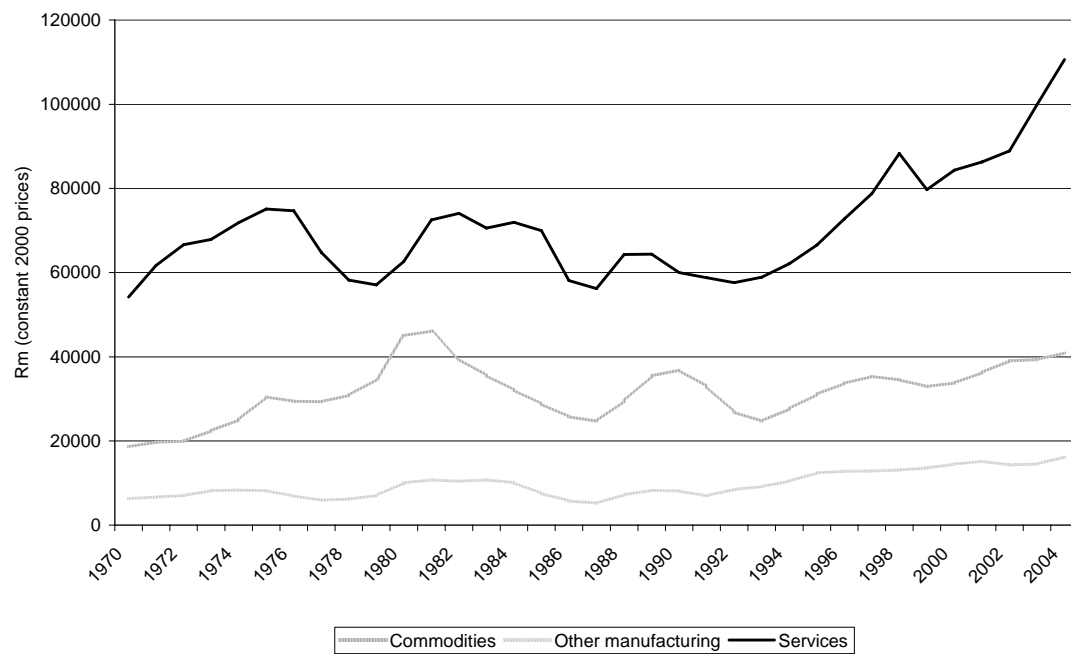
⁴ We understand that the data used in the TIPS database is Statistics South Africa Survey on Employment and Earnings Data, which is considered by some to be less reliable than Labour Force Survey data. However, there are other reasons not to use LFS data (see for instance Posel, Muller, Casale, 2004), and the SEE data has a significantly longer time series, and so we opted to use the latter.

Figure 5: Employment in commodities, other manufacturing and services



Source: TIPS data

Figure 6: Investment in commodities, other manufacturing and services



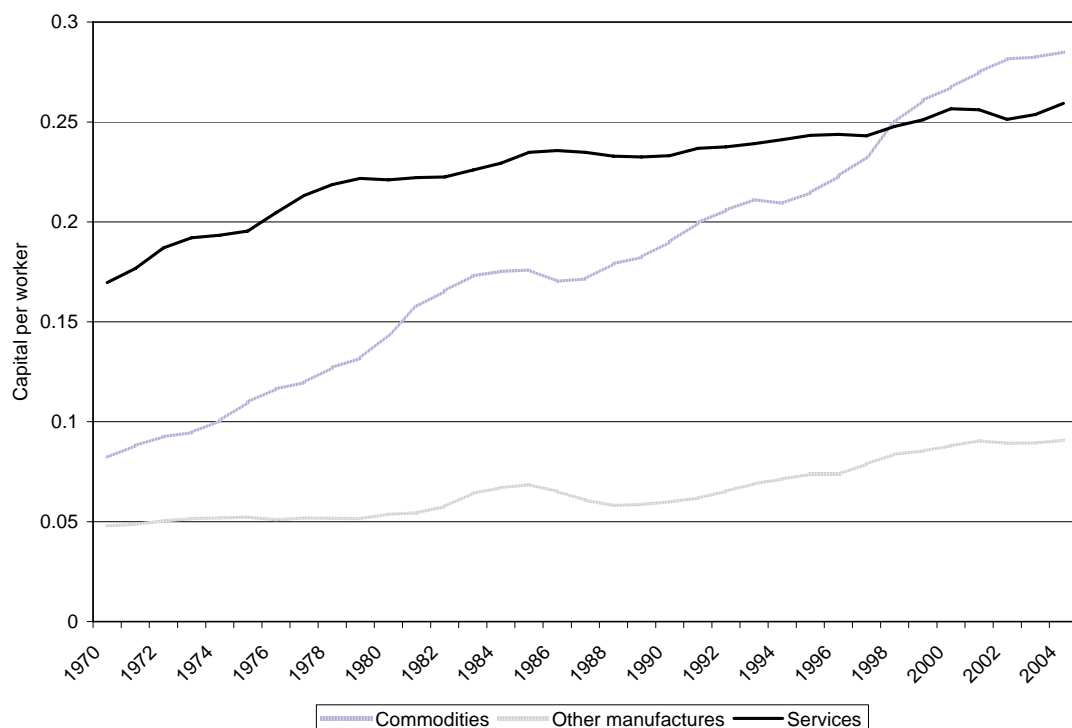
Source: TIPS data

4.6. Capital and skills intensity in commodities, other manufacturing and services

In general, capital per worker (capital intensity) is highest for services (see Figure 7 below) throughout the period. There has generally been slow but steady growth in capital intensity in other manufactures. However for commodities, capital intensity has increased dramatically over the period and even surpassed that of services in 1998.

While this bodes well for productivity and for skills accumulation, particularly in the commodities sector, this means that commodities are less likely to absorb the semi and unskilled workers in the future, and thus provide them with an avenue of skills accumulation. This has negative implications for inequality and social mobility in South Africa, though it is not clear that these trends arise because of high commodity prices.

Figure 7: Capital per worker in commodities, other manufacturing and service activities between 1970 and 2004



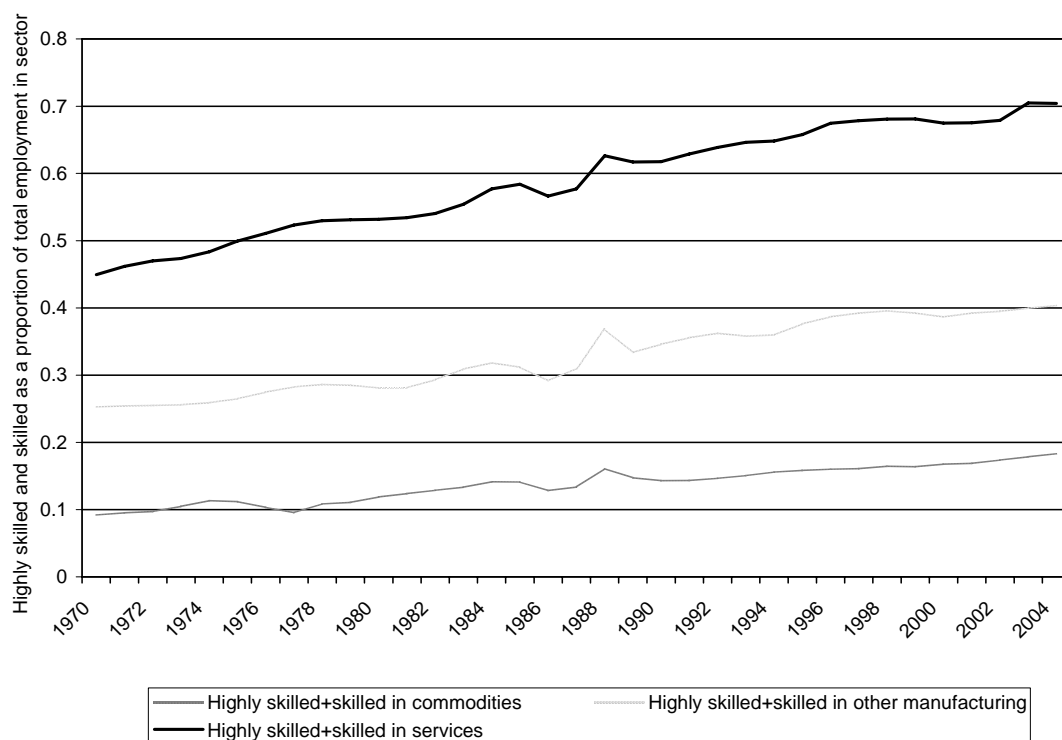
Source: TIPS

A large proportion of workers in commodities are semi-skilled and unskilled. This is consistent with Gylfason's (2000) observation that commodity (natural resource) based industries predominantly harbour lower skilled workers. Thus the externalities produced by training in and for these industries may not be as useful for other industries in the economy as would be the training/education gained in the manufacturing sectors. To the extent that this changes over time as a result of

increased use of capital over time, externalities emanating from this sector may increase but the economy's ability to absorb unskilled labour is diminished.

There is a gradually increasing proportion of skilled and highly skilled workers in manufacturing, even though there is still a large proportion that is semi/unskilled. However, a high and increasing level of skilled and highly skilled workers can be found in the service sector. This is an alarming trend, since investment has been increasing most in the services sector out of the three sectors analysed here, and employment has been increasing in services, while employment has in fact been declining in the other two sectors, which tended (at least until very recently) to be largely labour intensive.

Figure 8: Highly skilled & skilled as a proportion of total employment in commodities, other manufacturing and services between 1970 and 2004



Source: TIPS

5. Conclusions

In general, the commodities price boom has had relatively unexpected effects on the economy. Commodity output expansion has not been significant, largely as a result of the decline in the gold industry for exogenous reasons. The services sector has expanded rapidly, although it has been doing so for several decades and it is not clear that this is due to high commodity prices. At the same time, manufacturing output has not declined in most sectors, to some extent because of government intervention. However, in highly tradable and relatively unprotected sectors such as clothing, there

has been a substantial decline in output. Additionally, employment in services has increased while employment in manufacturing has decreased.

The impact of the allocation of factors of production is also somewhat nuanced. In general, there has been a substantial increase in the capital intensity of commodities, and a less substantial increase but still significant increase in the capital intensity of manufacturing sectors, as employment has declined but investment has remained roughly constant or increased slightly.

Both employment and investment have increased in the services sector. This is a worrying trend in light of the fact that the services sector generally employs skilled workers, the fact that employment has been declining in the relatively low-skill intensive manufacturing and commodity sectors, and the fact that the SA economy is characterised by high levels of unemployment among the unskilled. It is difficult to see how job losses in these sectors are due to high commodity prices, however.

Indeed, there may be very different reasons other than high commodity prices for the lacklustre growth in general in manufacturing output, the decline in manufacturing employment, and the increase in employment in the skills intensive services sector. Factors such as capital, labour, trade and output market distortions and a lack of physical and human capital accumulation may be far more important sources of these trends.

6. Policy implications

The current commodity price boom does not appear to have had the significant impact on manufacturing output and employment that we might have expected, for a variety of reasons. While certain manufacturing sectors, particularly the highly traded and relatively unprotected ones, have seen declines in output and employment, others have not.

This implies that substantial macroeconomic policy interventions of the temporary (such as foreign exchange accumulation) or longer term (such as a stabilization fund) kind as means of mitigating the effects of Dutch disease arising from a commodity price boom (described in section 3.3 above) are not warranted.

7. References

Atkinson and Hamilton (2003) - Savings, Growth and the Resource Curse Hypothesis, London School of Economics and Political Science, London, UK and The World Bank, Washington, DC, USA

Auty (2001) - The political state and the management of mineral rents in capital surplus economies: Botswana and Saudi Arabia, Lancaster University

Barnes, J, 2004, 'A strategic assessment of the wearing apparel sector', prepared for a ComMark / TIPS / SA Presidency workshop held in November 2004, available from www.tips.org.za

Casale, D, Muller, C, Posel, D, 2004, 'Two million net new jobs: A reconsideration of the rise in employment in South Africa, 1995 – 2003, TIPS forum paper 2004, available at www.tips.org.za

Deaton (1999) - Commodity Prices and Growth in Africa- The Journal of Economic Perspective Volume 13 No 3

Ebrahim-zadeh (2003) - Dutch Disease: Too much wealth managed unwisely- F&D Quarterly magazine of the IMF, Volume 40, Number 1

Fedderke, (2004) – From Chimera to Prospect: Toward an understanding of South African Growth Absence, School of Economics, University of Cape Town

Flatters, F, 2005, 'The economics of MIDP and the South African motor industry', prepared in connection with a TIPS / NEDLAC SATPP policy dialogue workshop held on 2 November 2005, accessible from www.tips.org.za

Gylfason (2000) - Natural Resources, Education, and Economic Development for the 15th Annual Congress of the European Economic Association

Heeks (1998) - Small Enterprise Development and the 'Dutch Disease' in a Small Economy: *The Case of Brunei*; IDPM Discussion Paper series, *Paper No. 56*

IMF Staff, "South Africa: Staff Report for the 2005 Article IV Consultation", IMF, August 10th, 2005.

Jourdan (2005)- Links with domestic industry, downstream processing and the provision of inputs: Resource based industrialisation in South Africa- Mintek, South Africa

Kahn, B. and Farrell, G.N., "South African real interest rates in comparative perspective: theory and evidence", Occasional Paper No 17, South African Reserve Bank, February 2002

MacDonald, R. and Ricci, L., "Estimation of the Equilibrium Real Exchange Rate for South Africa", IMF Working Paper WP/03/44, International Monetary Fund, March 2003

Segal, N & Malherbe, S, 2000, 'A perspective on the South African Mining Industry in the 21st Century', an independent report prepared for the Chamber of Mines by the UCT Graduate School of Business in association with Genesis Analytics, available at www.bullion.org.za

Neumayer (2004) - Does the 'Resource Curse' hold for Growth in Genuine Income as well? -London School of Economics

Papyrakis and Gerlagh (2004) - The Resource Curse Hypothesis and Its Transmission Channels - Journal of Comparative Economics

TIPS data is based on Quantec data, which uses Statistics South Africa, SA Reserve Bank, and other sources of data, see www.tips.org.za

Reserve Bank of Australia data available at www.rba.gov.au

SA Reserve Bank data available at www.reservebank.co.za

Sachs and Warner (1997) - Natural Resource abundance and Economic Growth- Center for International Development and Harvard Institute for International Development

Appendix 1: Increase in Platinum/Gold index (according to TIPS data)



Note: Calculated as an index based on daily prices of platinum (weight: 52.4%) and gold (weight: 47.6%)- based on year-to-date SA exports (January to August 2005)

Appendix 2: Net exports of commodities and other manufactures, by product (according to TIPS data)

Figure 9: Net exports of commodities, by product

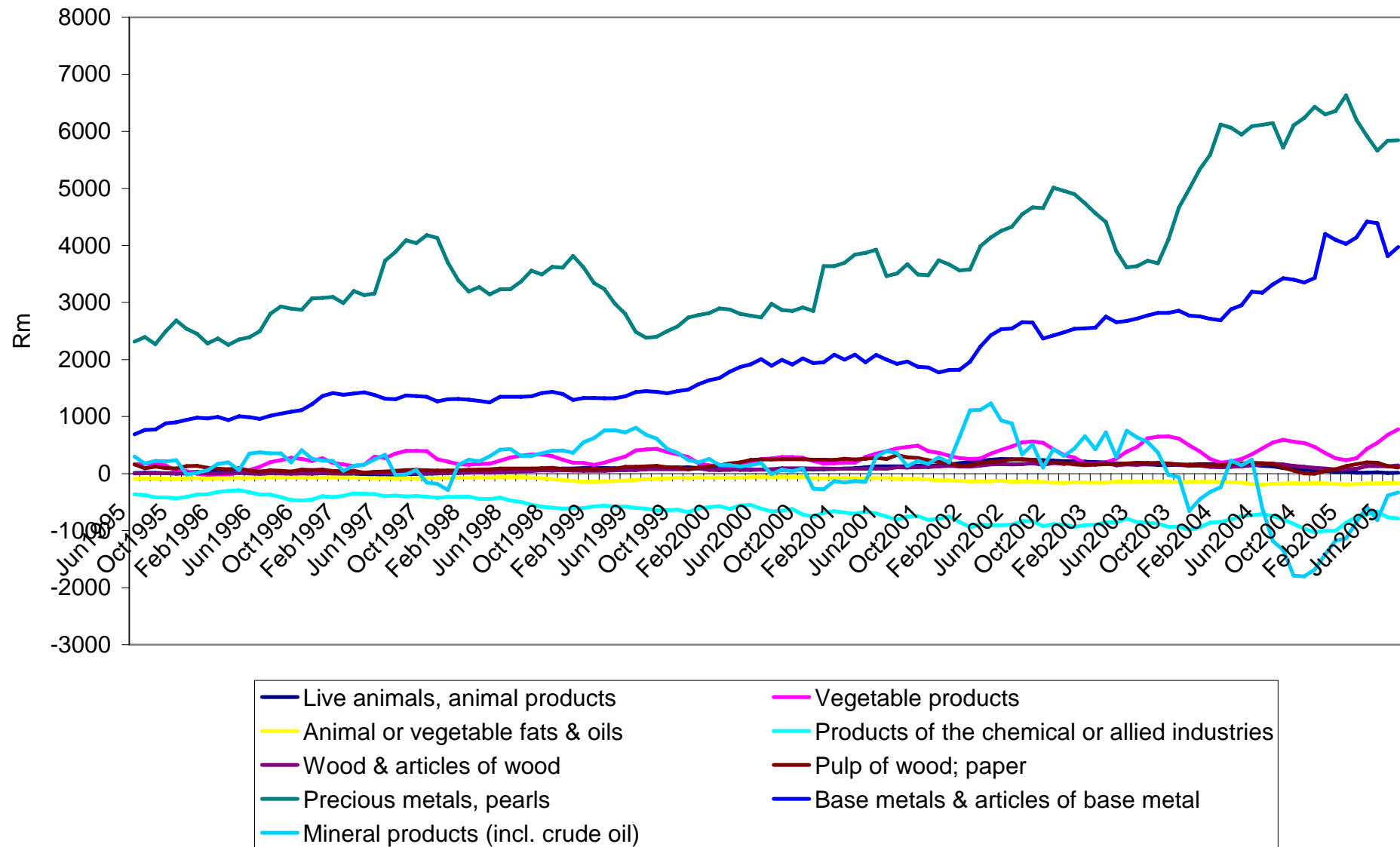
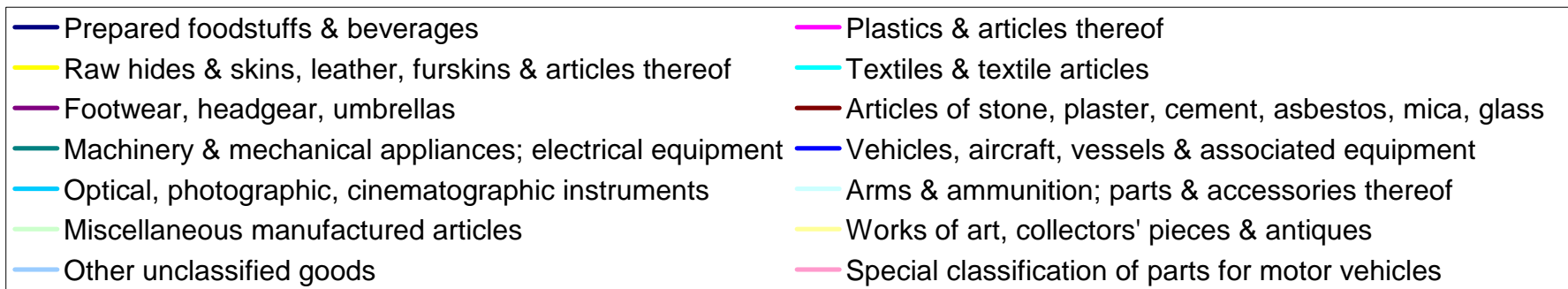
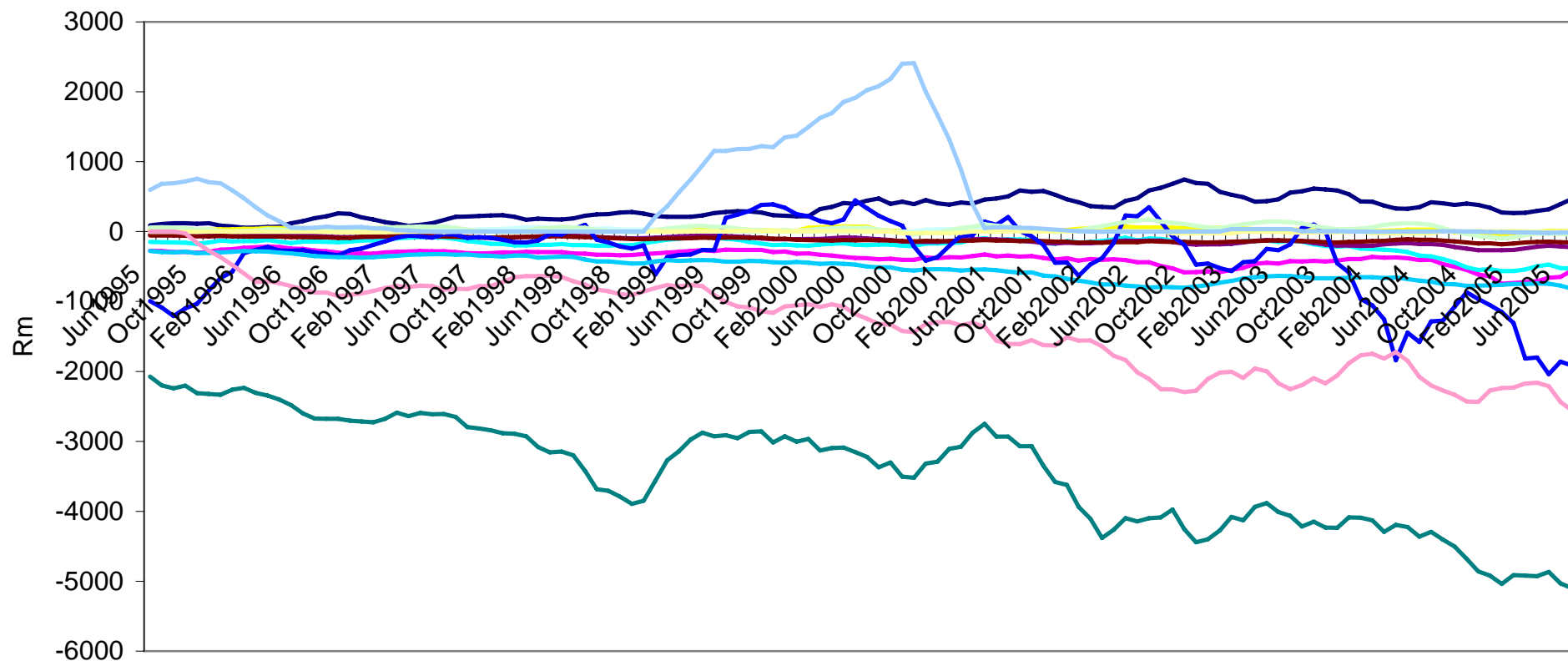


Figure 10: Net exports of other manufactures, by product



Appendix 3: Output of commodities, other manufacturing, and services, by product (according to TIPS data)

Figure 11: Output of commodities by product

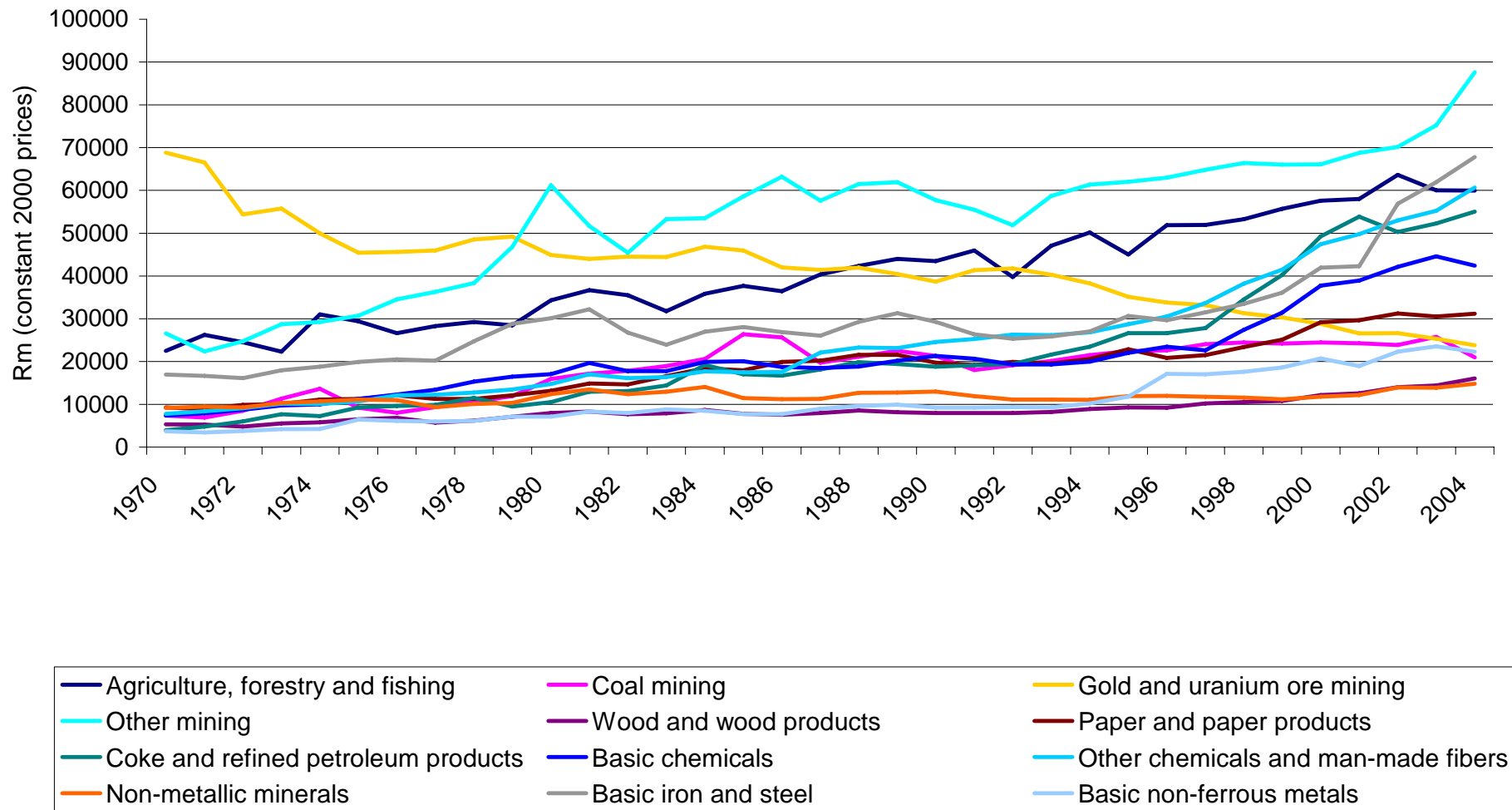


Figure 12: Output of other manufacturing by product

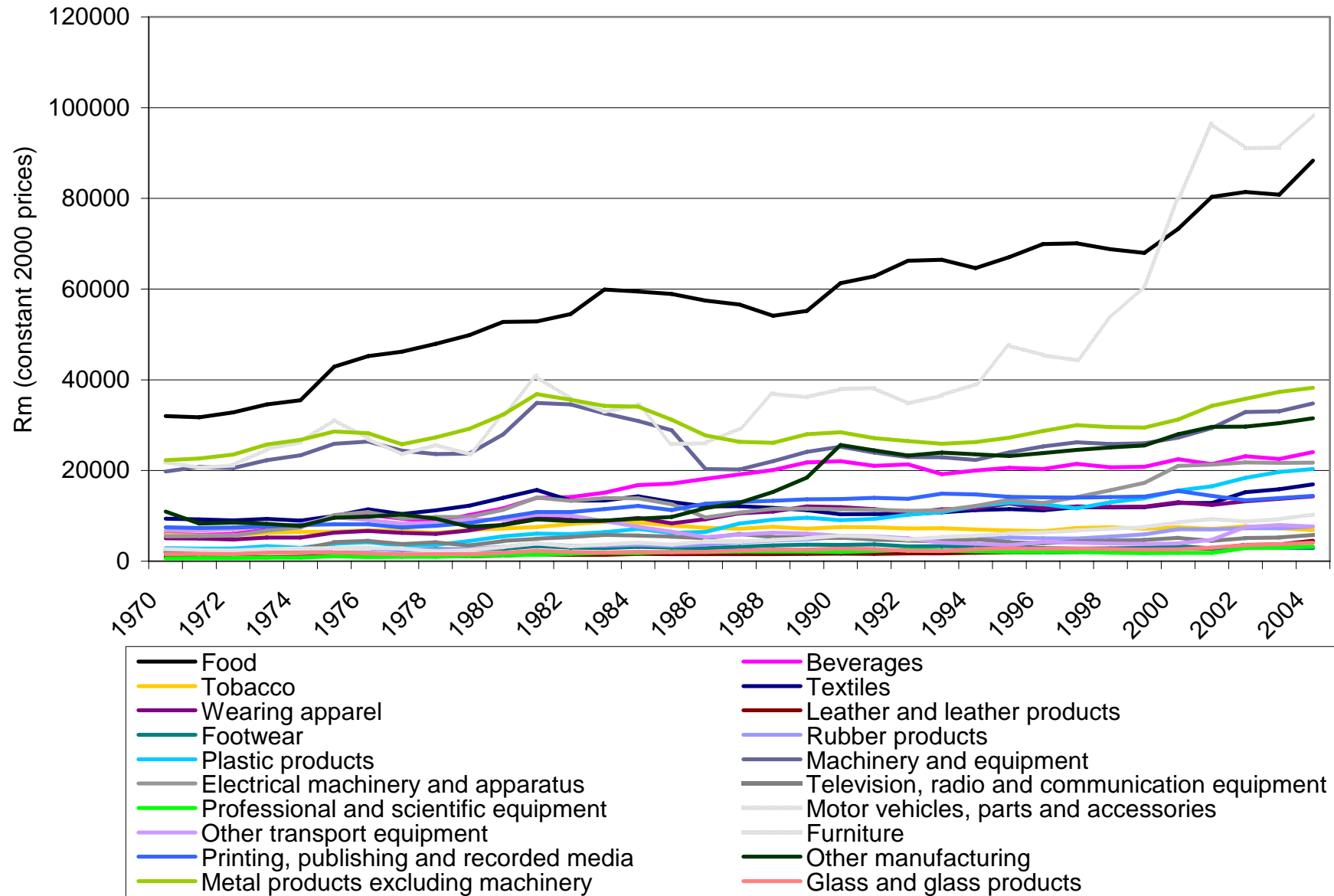
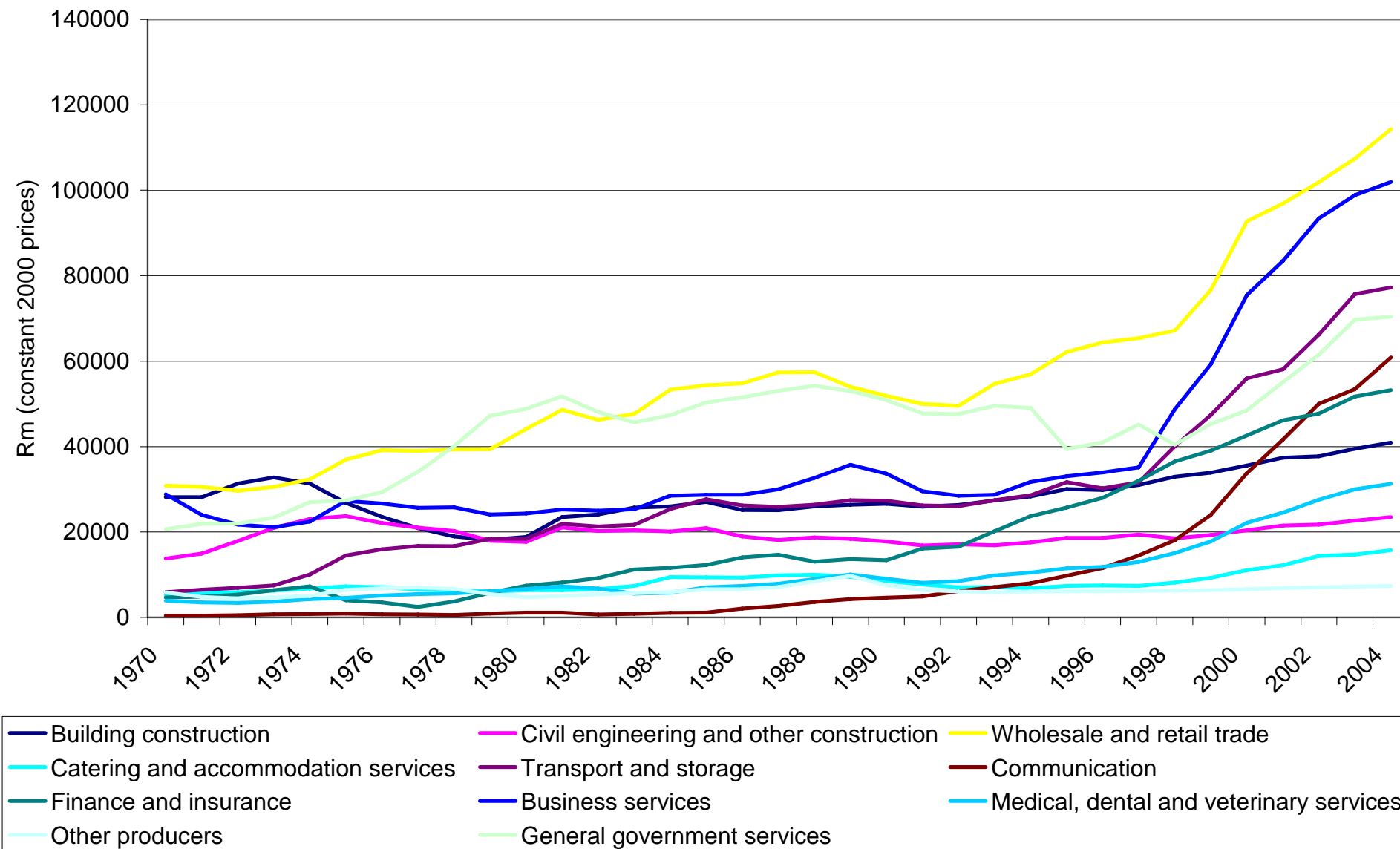


Figure 13: Output of services by product



Appendix 4: Employment in commodities, other manufacturing and services, by product (according to TIPS data)

Figure 14: Employment in commodities by product

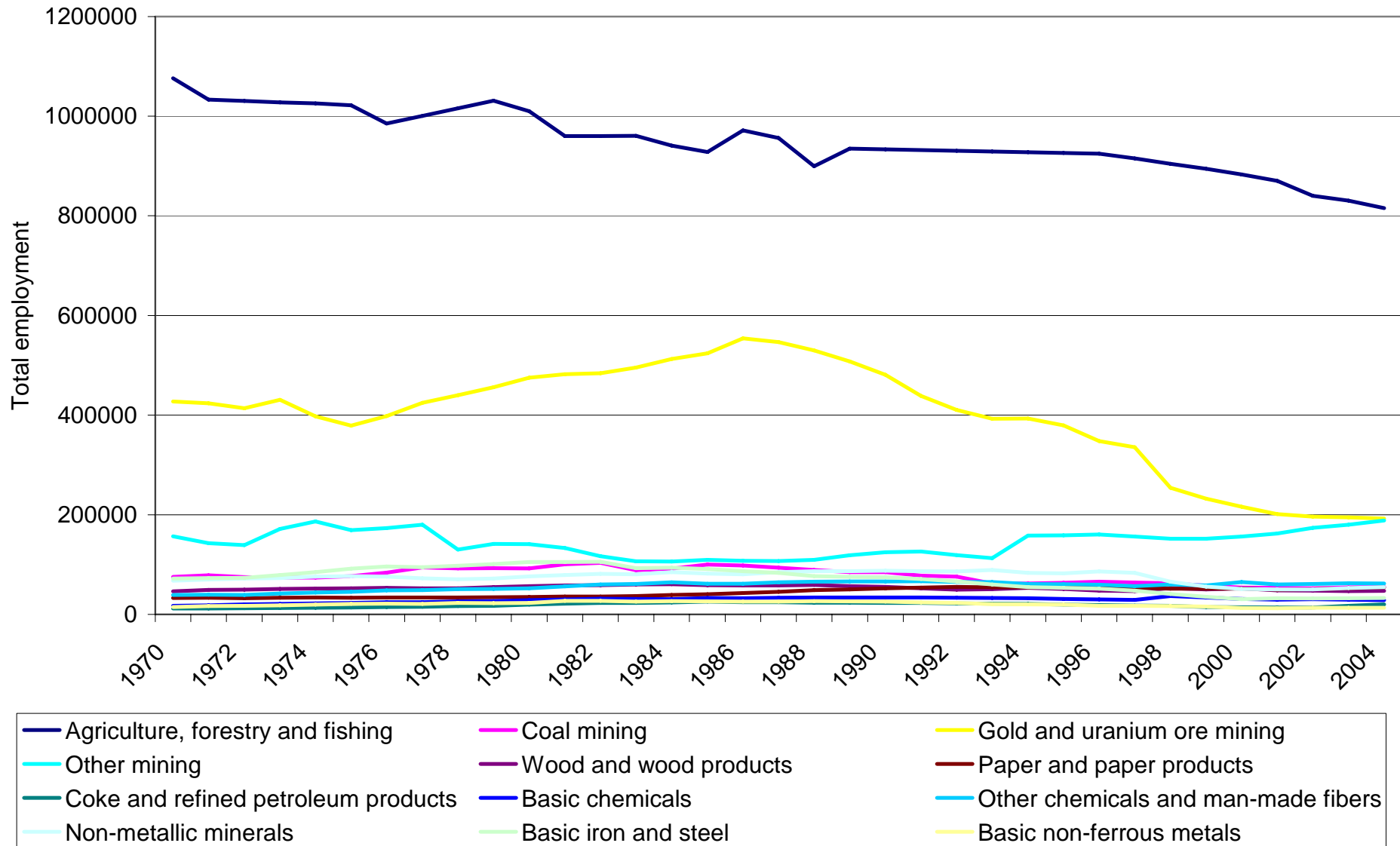


Figure 15: Employment in other manufacturing by product

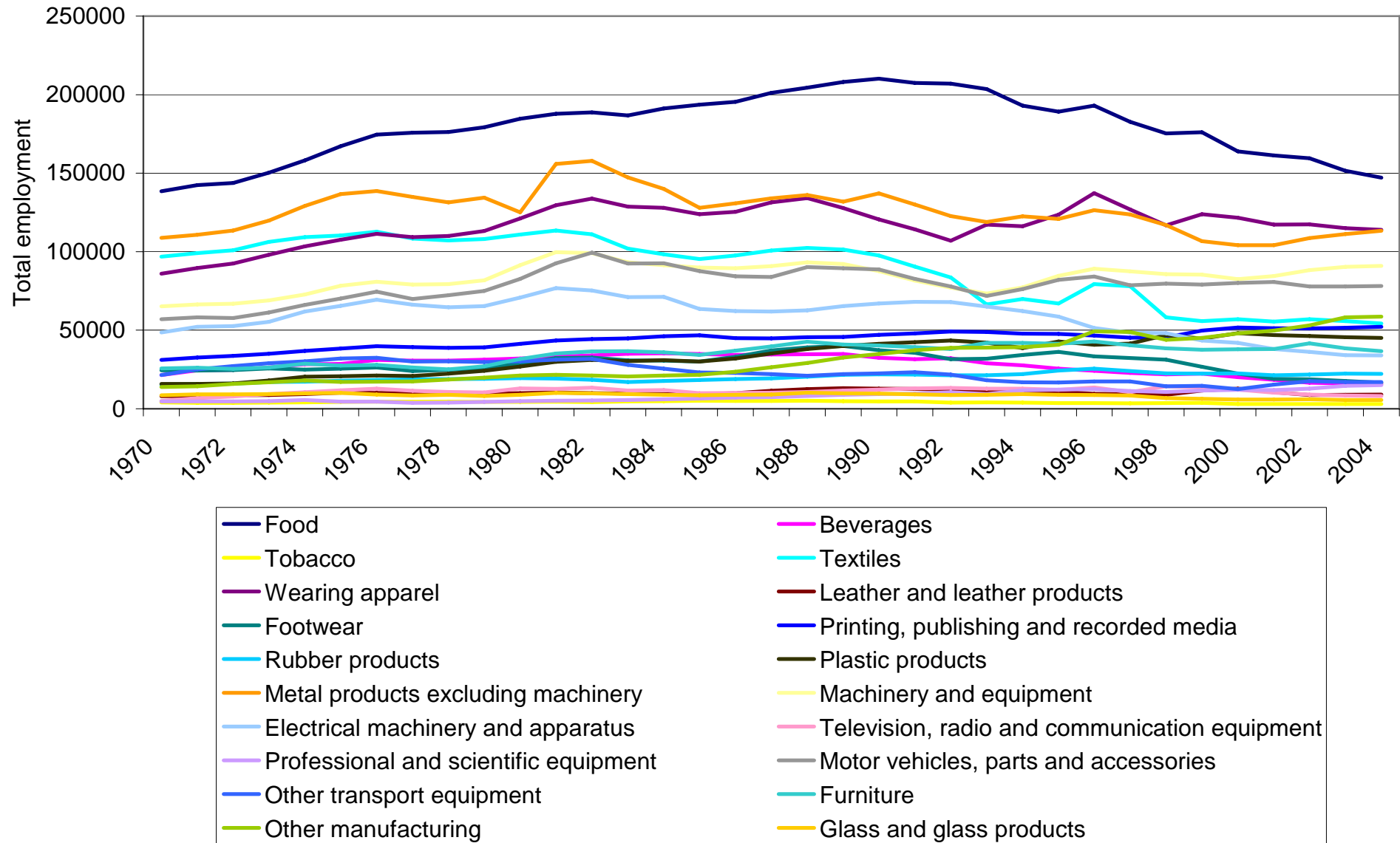
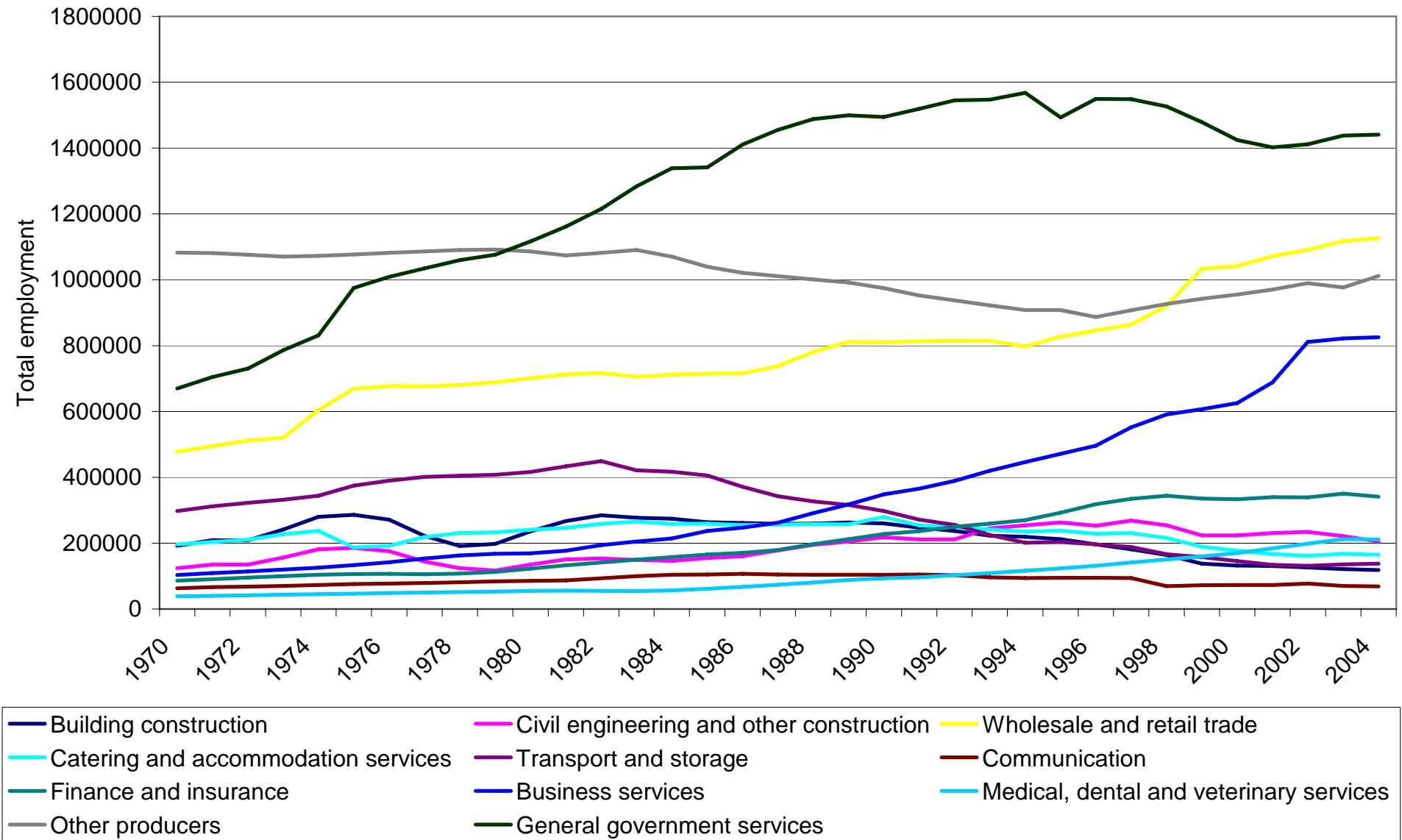


Figure 16: Employment in services by product



Appendix 5: Investment in commodities, manufacturing and services, by product (according to TIPS data)

Figure 17: Investment in commodities by product

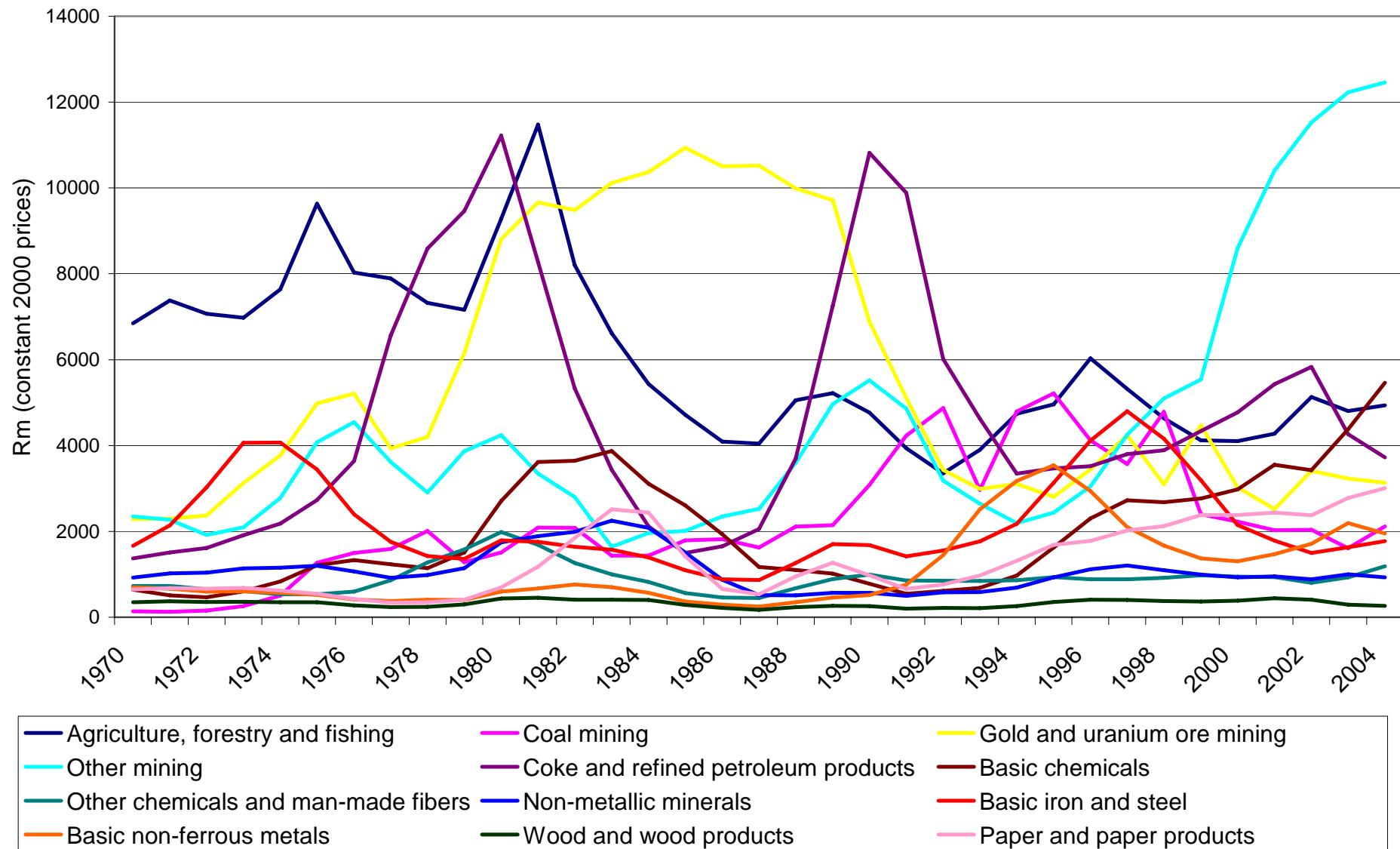


Figure 18: Investment in other manufacturing by product

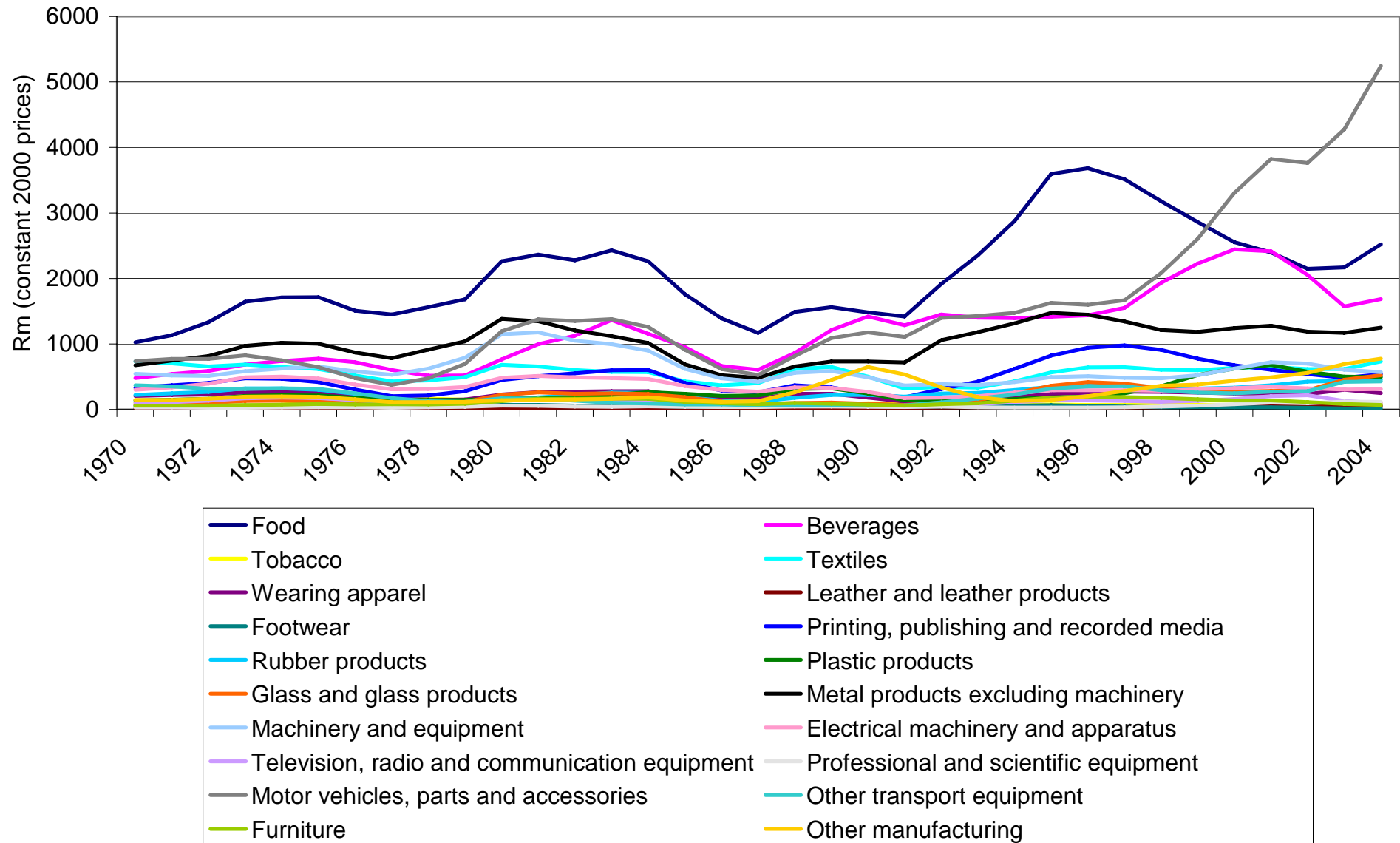


Figure 19: Investment in services by product

