

Delaying the Inevitable: Resources Booms in Peru

September 27, 2009

Osmel Manzano

*Inter-American Development Bank and
Universidad Católica Andrés Bello*

Diego Winkelried

*St John's College,
University of Cambridge*

Economic growth in Peru has been closely related to the evolution of its diversified primary sector. The conventional wisdom suggests that the diversity of exports is beneficial since it may prevent the volatility of international commodities markets to pass-through to the domestic economy. Nonetheless, the Peruvian experience shows that primary exports diversity can also have a pervasive effect, as it may motivate the formulation of poor resource policies. We identify booms and collapses of resource exports in Peru and relate them to the performance of its economy. The data show a succession of non-overlapping booms and collapses of different resources. We hence argue that crises originated by a collapse of a resource export are buffered and reforms are delayed by another export boom. Consequently, booms in a sector would hide declines in others, giving a fake impression of prosperity and delaying necessary responses to the declining industries. This implies that countries as Peru need an even better institutional setting than what could be sufficient for a single-good exporter.

1 Introduction

The role played by natural resources in development has been part of the economic policy debate for some time. From the early contributions of Prebisch (1950) and Salter (1959) to the influential work by Sachs and Warner (1995), there has been a perception that resource abundance is detrimental for development.¹ Recent literature has found evidence that there is a correlation between resource abundance and growth² and there are some potential hypotheses to explain why this phenomenon is occurring. Nevertheless, empirical work done on these channels have failed to find concluding evidence of them.³

One key issue often overlooked is the performance of the resource sector itself. Since economies like Peru rely heavily on natural resources, it should be expected the performance of this sector to have an impact of the rest of the economy. Furthermore, traditionally, this performance is assumed

¹ Though the work of Salter (1959) does not attribute any negative effect to natural resources per se, its theoretical framework is the reference used to characterize the “Dutch Disease”. This term is used to describe the de-industrialization of a country after a resource boom. The term was coined by the magazine *The Economist* in a article about the Netherlands (*The Economist*, November 26, 1977, pp 82-83)

² However, some recent works have cast some doubts even about these stylized claims. See for example the collection of papers edited by Ledermann and Maloney (2007).

³ Probably the best proved fact is that there is “Dutch Disease”. Stijns (2003) uses a gravity model of trade and finds evidence on Dutch Disease. Nevertheless, there is no evidence that this has a negative impact on growth or welfare.

exogenous.⁴ However, this sector is not immune to the institutional arrangements and changes of them in a particular country. Blomstrom and Kokko (2007) reviews the performance of Scandinavian economies, which are considered successful resource-endowed economies, and point out the role played by the institutions surrounding the resource sector as one of the driving factors that allowed these economies to develop based on their resource endowment. A similar case is made by Wright and Czelusta (2007) who discuss the role played by the mining sector in the development of the United States in the nineteenth century. Again, the authors stress how the institutions around the mining sector allowed its development and spillover to the rest of the economy.

In this regard, Maloney (2002) argues that this has not been the case of Latin America. He makes a case that the institutional setting in Latin America countries did not allowed for the resource sector to have positive technological spillovers on the rest of the economy. Nevertheless, as important as those spillovers is the performance of the sector itself and the impact of the local institutional arrangements. As argued in Manzano and Monalid (2008) for the Latin American oil sector, institutional changes affect the evolution of the sector and had led to important cycles of it.

This paper studies the Peruvian experience. By the mid-nineteenth century, the Italian scientist and geographer Antonio Raimondi, amazed by the Peruvian natural resource wealth and diversity, coined a phrase that is still fresh in the Peruvian's mind: "Peru is a beggar sit on a golden bench". Peru was a country of paradox at the time of Raimondi and, disappointedly, was also during the second half of the twentieth century. Leave the contradiction in Raimondi's phrase aside and picture the actual scene: what would the beggar do if he suddenly notices the golden bench? Would he stop being a beggar? What if the bench is made of gold, copper, iron ore, a sack of fishmeal and a barrel of oil? Would the beggar be better off with the multiproduct bench? We address these questions by studying the role of primary exports and its diversity on the growth of the Peruvian economy for the last 6 decades (1940 - 2005). The beggar in our story is the combination of an underdeveloped state, weak public institutions and attitudes towards policies that have hampered the country from successfully implementing and sustaining a coherent growth strategy. Furthermore, we stress that the heterogeneity of the exportable natural resources has introduced short-run distortions that eventually prevented the country from stop being Raimondi's beggar.

1.1 Growth, the primary sector and investment

At first glance, Figure 1(a)⁵ reveals three growth regimes in the last 60 years, as measured by the Real GDP per capita.⁶ The first one is a period of rapid growth interrupted by few slight and short recessions. It lasts until 1975 and is the result of a textbook export-led growth strategy. The second regime can be described as a long-lasting growth crisis along with violent business cycles until the early-90's, and is the result of several attempts to implement drastic structural reforms towards a

⁴ The typical empirical analysis would have a right-hand-side variable (treated as exogenous) that measures resource abundance, e.g. natural resources exports as a share of Gross Domestic Product or net natural resources exports per-capita.

⁵ All the series displayed in figures are centered one-year moving averages, to ease their visualization. However, calculations are based on the actual data. See Appendix A for data sources.

⁶ Due to short tenure, in Figure 1 we have ignored three individuals who have served as president: Pérez Godoy (1962 - 1963), Lindley (1963) and Paniagua (2000 - 2001).

fully-fledged ISI regime. It ended up with the most severe macroeconomic crisis in Peruvian history. The third regime begins in 1992 with the implementation of a successful stabilization plan along with major structural reforms, remarkably financial and trade liberalization, to bring the economy back to an orthodox export-led growth strategy.

[Figure 1 around here]

It is apparent from the figure that economic growth has been closely related to the evolution of the primary sector. The two growth phases – from the 50's to the mid-70's and since the 90's – coincide with the increase of real primary sector exports per capita whereas the shrinking stage – from 1975 to 1991 – is associated first with the stagnation of the primary sector and then with its collapse. As discussed later, regardless of the political orientation of the administration in office or the economic model adopted, the expansion of the primary sector has always been at the core of the growth strategy. When the country failed to overcome supply-side constraints, usually by incorporating new land, discovering new resources or exploiting new fields, the economy would stagnate and would not be able to move to an intensive stage of the growth process (rather than the typical extensive stage of a primary producer).

This fact establishes a link between Figures 1(a) and 1(b). Even though we do not count with sectoral disaggregate investment data, it is likely that aggregate figures mimic the behavior of the investment rate in the primary sector, especially before the 90's. It is clearly shown that the investment cycles throughout our sample can predict the behavior of the primary exports, sometimes with a considerable lag due to the time large projects took to mature. Indeed, the sharp decrease in the private investment rate from the late-50's to the beginning of the 70's drives the poor performance of the primary sector observed from the mid-70's to the 90's, whereas the temporary recoveries of the ratio in the 80's and the 90's determined the fast expansion of the primary sector of the 90's, and even faster in the 2000's.

1.2 A glimpse of the recent history

A story of drastic macroeconomic experiments usually brought by severe structural reforms underlies the evolution of the Peruvian economy since the mid-twentieth century. Since the country won independence from Spain in 1821 until the early-1960's, growth was based on the close relationship between the local entrepreneurship and foreign multinationals, which provided the basis to exploit new natural resources and to expand already established projects. Hence, the early nature of economic growth sought to meet the international demand of fast-expanding products with supply-side responses often eased by foreign investment.

Following lucid arguments in Thorp (1991), the marriage between local and foreign capital over more than a century can be regarded as the smoking gun of the economic crises that follow from the 60's. This collusion limited the managerial capacity of the local elite, which would get used to rent-seeking often delegating the most important and risky investments, such as those involved in the development of the infrastructure needed for the exploitation of the natural resources, to foreign partners. As this long-running agreement was highly profitable to the elite, it eliminated

the incentives to search profit opportunities in other sectors but the primary, and at the same time prevented any sort of government intervention that would hamper their interests, typically in the form of industrialization policies.⁷ Later in the century, when supply-side expansions became more complex or when the need of diversification grew stronger and required some sort of organized central planning, the inability of the government in providing the correct incentives and of the private sector in responding to them and in managing new business became evident.

The model delivered good macroeconomic results. It did not coexist with macroeconomic disequilibria: exports revenues financed comfortably fiscal expenditures and were not outstripped by import expenses so international booms would not pass-through to domestic prices. Nonetheless, it was unsustainable as a development model. The low ability in government actions towards sound redistributive policies and the uneven performance of the modern export-led sector and more traditional sectors sharpened the urban-rural income gap, causing social indicators as inequality to worsen systematically. This discontent called for a change in the distribution of the profits from natural resource exploitation and provided the popular support for a complete change of the economic order in the 60's.

The electoral campaigns in the early-60's were packed with a nationalist rhetoric that made new foreign and local investors uncertain about the real profitability of long-termed projects in the primary sector. Indeed, in the 60's while the country was reaping the fruits of large investments in exploration and exploitation (especially in mining) made in the 50's, a major exportable supply crisis in the primary sector was about to show up in the mid-70's. As shown in Figure 1(b), a bequest of Belaunde's first administration was a substantial decrease in the investment rate and hence a decrease in the investment in primary sectors. Furthermore, redistributive reforms promised during the electoral campaign were carried out only partially, the profits of the newly born industries (the product of a weak and incomplete ISI scheme) were unequally distributed and the poor performance of agriculture (along with the lack of a full-fledged agrarian reform) sharpened further the urban-rural gap.

This was the social and economic background that rendered the most controversial period of policy-making in modern Peruvian history. In 1968 General Velasco seized power in a military coup and began what was known as the *Peruvian experiment* (Jaquette and Lowenthal, 1986). This was an extreme version of the ISI that relied heavily on the expansion of the primary exports, where after massive expropriations the government became the main entrepreneur and investor in the economy, see Figure 1(b). The increase in the size of the government along with the downward trend in private investment, due mainly to the leap in the confiscation risk and reinforced by political instability, began what would be a feature of public finances in the next 20 years and 4 successive administrations (from 1970 to 1990): large fiscal deficit financed with foreign debt, i.e. twin fiscal and current account deficit as displayed in Figure 1(c).

⁷ One of the most important attempt to establish a basic protectionist scheme compatible with foreign capital and aimed to promote economic diversification was made by Bustamente y Rivero in 1947. The scheme came in the form of capital controls and the introduction of tariffs almost to every sector in the economy. The lack of discrimination among sectors encouraged the local elite to further protect their more profitable interests in the primary sectors and reinforced the tendency of the private sector to favor economic liberalism. In 1948, the right-wing General Odría took over in a coup, promoted legislations extremely favorable to foreign capital in almost every productive sector and finished most of the controls recently established (Thorp and Bertram, 1978).

Velasco's regime proved problematic by the mid-70's and no serious attempt to correct the unsustainable pattern of accumulation of the economy was made during the 80's (the Belaunde's and García's democratic administrations), even though the decade began with an extremely favorable external environment. As a result of this bequest along with populist macroeconomic policies, by the beginning of the 90's the country was witnessing the most severe macroeconomic and social crisis in history. The turmoil provided the political support to carry on a series of structural reforms, mainly towards trade and financial liberalization and towards limiting the role of the state in the economy, that would take the country back to the market-oriented policies of the 50's.⁸

In contrast to the Peruvian experience, by the 50's many Latin American countries had adopted an ISI regime, aiming to reduce the importance of their primary sectors which were not as dynamic as the Peruvian.⁹ Not only industrial policies were delayed, but they also were not designed in order to develop alternative economic activities around the resource sector (rather than exploitation). As argued in Maloney (2002), Latin American countries behaved differently to other similar endowed countries like Australia and Scandinavian countries. In the later cases, both the government and the private sector worked towards the development of activities linked to the resource sector. This effort included even changes in the educational and innovation systems. In contrast, in Latin America the natural resource sectors were viewed as enclaves and only as a source of fiscal revenue. Consequently, ISI policies almost always promoted the development of activities *away* the resource sector and supported a broad base of activities, usually without any criterion of selection. Peru was not the exception and many of the familiar abuses of ISI appeared. For example, as documented in Thorp (1977), by the end 60's there were no fewer than 13 automobile assembly plants in a country of about 13 million people with an effective market far below that figure.

[Figure 2 around here]

Moreover, the industrial policies applied were not necessarily sustained. It would take too long to discuss the particularities of these policies and the general development of the non-resource sector (which goes beyond the scope of this paper), but we could illustrate this claim by briefly analyzing the trends in trade policy, closely akin to industrial development. Figure 2(a) graphs the relationship between tariff revenues and imports and though the implicit average tariff does not fully reflect trade policy, it gives a fair idea of its orientation.¹⁰ As seen in the figure, tariffs were high in the early 50's which, according to Maloney (2002), was a common feature of many countries, including Australia and the Scandinavian countries. Similar to those countries, Peru seemed to start liberalizing the economy early. Nevertheless, in the 60's we had the beginning of ISI policies and tariffs were increased again. By the late 70's they were lowered again only to get increased in the 80's and reduced in the 90's with trade liberalization. The cyclical behavior of this tariff measure suggests

⁸ The economic model of the 50's and the one beginning in the 90's are similar in the incentives to foreign capital and the encouragement to openness. They are different in two important aspects (the bequest of previous decades) that place policy challenges to the current scheme: the foreign debt burden and the high extent of urbanization.

⁹ See Thorp and Bertram (1978) and Hofman (2000) for further insight.

¹⁰ As it is widely documented in the trade literature, there are other issues such as tariff dispersion, effective protection or non-tariff barriers, that defines trade policy. The relevant figures for the Peruvian case (average tariffs, their dispersion, effective rate of protection and so on) can be found in Morón *et al* (2005, Chapter 3).

that trade policy was not necessarily stable over long periods of policy-making. A similar pattern is observed for industrial policy.

[Table 1 around here]

In addition to tariffs, exchange rate policies could have hampered the export of new products. Government might favor the non-tradable sector by highly overvaluing exchange rate for political reasons, whereas the resource sectors would often beget appreciative pressures (a Dutch Disease effect). As seen in Table 1, during the 50's there was a significant appreciation of the real exchange rate (RER): the average exchange rate was 27% lower than in the 40's, and this difference is statistically significant. Nevertheless, after that period it started depreciating and in the 70's it was statistically similar to that in the 50's. However, by 1975, before a new period of appreciation began, non-primary exports were just 12% of total exports, compared to 7% in the 60's. Non-primary exports gain terrain during the 80's when they reached 25% of total exports, but this increase is associated not only to the RER appreciation but also to the stagnation of the primary sector.

The limited development of alternative exports could be due to the fact that the real exchange rate during the period of analysis was fairly volatile. In Figure 2(b), as a proxy of real exchange uncertainty, we present the standard deviation of the five-year realization of the real exchange variation (for a period of five years).¹¹ We see that after 1953 it crossed the threshold of 10% and continued to increase over the years reaching a maximum of almost 60% in 1982. A standard deviation of 10% implies that if an investor had a prediction of where the exchange rate would be 5 years ahead, the 95% confidence interval of that prediction would be roughly $\pm 20\%$ around his central prediction. For greater values, of course, the uncertainty is considerable, to the extent that the real exchange rate would be located, from the forecaster point of view, almost anywhere.

This introduces an interesting argument by Hausmann and Rigobon (2003) of poor growth performance in wealthy endowed countries. Their alternative to the usual *resource curse* explanation is that countries that have a high concentration of exports in primary goods tend to have volatile terms of trade, and if the policy-makers do not take this fact into account, this would translate into a volatile exchange rate (for example, if it applies some sort of nominal exchange rate pegging). The authors argue that a volatile real exchange rate together with non-convexities such as entry or exit costs and financial imperfections would make the country specialize inefficiently in non-tradables. Under these circumstances, the producers of tradables cannot easily predict their profitability in the time horizon of their investment, and since they have income and cost denominated in different currencies, will tend invest less. In the Peruvian experience, this could help understand why the country did not diversify in activities different to natural resources.

In summary, it seems that in Peru there were poor conditions for the development on non-traditional exports. Tariffs and industrial policies were not necessarily stable over long periods of policy-making. A similar argument applies to exchange rate policy. These elements reduce the incentive

¹¹ For a point in time – January 1950, for example – we calculated the change in the real exchange rate in five years – up to January 1955 in the example. Then we computed the standard deviation of these changes for the next five years. The figure shows the standard deviation of this “forecast” from the point of view of the period where it was made, i.e., January 1950. We chose five years, because we think it is a conservative estimate of the maturity of a private medium-scaled exploitation project in an economy. Of course, the longer the time horizon, the larger the volatility.

to invest in the tradable sector. Clearly, there are other elements that are relevant to understand the performance of that sector, but they are beyond the scope of this paper.

1.3 Our argument

We stress that the *diversity of exports* is a crucial element to understand the aforementioned growth stages, not only through its effects on the balance of payments and fiscal revenues but mainly through the way it affects the promotion and discipline of economic policies.

The conventional wisdom suggests that the diversity of exports is beneficial since, as in portfolio theory, it may prevent the volatility of international commodities markets to pass-through to the domestic economy.¹² Furthermore, recent evidence, for instance in Imbs and Wacziarg (2003), shows that as countries develop they move from a concentrated productive basket towards a more diversified basket until certain development level is reached where they start specializing. In the line of this finding, theoretical contributions as in Acemoglu and Zilibotti (1997), show that development and diversification could go together.

However, our analysis of the Peruvian experience shows that primary exports diversity can also have a pervasive effect. It is often the case that crises are buffered and reforms are delayed by export booms, and what makes the Peruvian case interesting and non-standard is that, throughout the country's recent history, booms are driven by different export goods.¹³

With a diversified natural resource export supply, we argue, there have not been enough incentives to change the extensive nature of growth. Generally speaking, booming sectors delayed the formulation of industrial policies until the 60's and, since then, allowed the government to sustain inadequate industrial and macroeconomic policies – often too ambitious and based on false assumptions about the response of the private sector to such stimuli – that otherwise would have never been followed. It has been argued elsewhere that short-run volatility – usually caused by misguided policies – has overlaid the underlying structural problems of the country: its inability to implement a more inclusive growth strategy and the underdevelopment of institutions that would encourage this strategy and reduce the vulnerability of the economy to short-run crises.¹⁴ Hence, we claim that the diversity of exports and its management have contributed to the persistence of this vicious circle.

Our argument is illustrated by an empirical regularity observed at the disaggregate level: the *non-simultaneous* or *non-overlapping* booms or shrinks among the various exports, together with the *overlap* of booms and shrinks of different products. Roughly, once the boom of export good *A* ends, a booming phase of good *B* would begin. Besides, a drop in the export revenue of good *A* is usually compensated by the increase in the export revenue of another good, *B*. In a nutshell, during crises a new “savior” would appear, in the form of a possibly new export good. This has two consequences: firstly, it stalls a sound reform or sensible macroeconomic policy when facing short-run crises, and secondly it also allows the government to avoid deeper reforms to consolidate

¹² De la Cuba and Ormeño (2003) provide a detailed empirical analysis of the relationship between export concentration and volatility for the Peruvian and other Latin American economies since the 80's. Besides, the claim has been formally estimated by Ledermann and Maloney (2003) who find a negative effect of exports concentration on growth.

¹³ A careful historical account of the external crises during the period of our analysis is found in Parodi (2000).

¹⁴ See Thorp (1987, 1991) and Dancourt (1999).

specific resource sectors that may be shrinking. Thus, when the country ran out of booming products and the correction to cumulative serious disequilibria could not be delayed any longer, the overall collapse of the economy was inevitable. This was the scenario by the beginning of the 90's.

2 Comparative advantages and the evolution of primary exports

The Peruvian economy enjoys several comparative advantages in the exploitation of natural resources. In *agriculture*, some regions of the country as the Costa enjoy mild weather conditions and products such as cotton and sugar can be cropped all year round, with no seasonality. Hence, instead of hiring temporary workers for cropping, the crops can be managed as regular enterprisers with long-term contracts and permanent workers. This advantage eases the achievement of economies of scale in the production of such exportables, as it was the case before the 60's.

On the other side, off the Peruvian coast lies one of the most fecund *fishing* areas in the world. The Humboldt Sea Current colludes with the sharp Peruvian coastal shelves forcing nutrient rich cold water to the surface and hence rendering the largest coastal upwelling system. The phytoplankton which thrives there is fed upon by a huge mass and variety of species including anchovies and sardines. Upwelling occurs off Peru year-round and is irregularly disrupted by *El Niño* Southern Oscillation phenomenon. When it takes place every 4 to 8 years, the surface temperature of the water rises and the nutrient rich environment that promotes the abundance of sea life temporarily disappears.

Finally regarding *mining*, Peruvian mines and fields are usually polymetallic which allows for some diversification of production and ensures mining companies some extra revenues coming from subproducts. Furthermore, the mineral found in the largest fields – especially gold, silver and copper – is of a very high grade, which makes refinement and other operational costs relatively low.

The country's wealth in natural resources and the aforementioned comparative advantages in exploiting them have determined the historical importance of the primary sectors: by the beginning of the 50's, primary exports accounted for 90% of total exports, whereas by the beginning of the new century this ratio was as high as 70%. Notwithstanding, primary exports are to some extent diversified. Figure 3(a) shows the share in total exports due to the main primary products. Historically, the main export has accounted at most for 30%, with an average of about 20%, whereas the importance of the second and the third export goods together is of a comparable magnitude (an average slightly higher than 20%). The contribution of the fourth and fifth export goods together is still a non-negligible average of 10% to 15%.

[Figure 3 around here]

Within the Latin American context, Figure 3(b) sorts the countries of the region¹⁵ according to three indicators of concentration: the share of the main export, the share of the three most important exports and the number of goods that account for 50% of the exports. Because of data availability, these figures are computed for the period 1980 – 2000.

¹⁵ Besides Peru, the countries in Figure 3(b) are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Uruguay and Venezuela.

It can be seen that the Peruvian export supply is among the most diversified of the region. According to the first indicator (share of the main export), Peru is only beaten by Argentina, Brazil and Uruguay, whereas Mexico is added to the list when analyzing the second criterion (share of the 3 most important exports) and Guatemala when looking to the third criterion (number of products that explains 50% of exports). It is worth-mentioning, however, that in the case of Argentina, Brazil and Mexico an important share of exports corresponds to non-primary products, so Peru can be located at the top of the ranking of diversified *primary* exports (especially, when compared to neighbor countries such as Chile, Colombia or Ecuador).

2.1 The behavior of disaggregate exports

At the disaggregate level we can observe that a given good changes its position in the ranking considerably, i.e. “the star products” are not always the same. This is clearly seen in all panels of Figure 4, where over our entire sample the share of almost every single product is surpassed by the share of another at least once.

[Figure 4 around here]

Before the 60's, large-scale agricultural products as *cotton* and *sugar* were the main exports, both crops contributing about 50% of the total value of primary exports. Since the 50's these crops constantly lose importance in the export supply of the country, their share started a persistent decline. The sector collapsed from the late-70's on as revealed by the dramatic decrease in the export quantum – see Figure 5(a) –, suggesting that the importance of the sector is determined by its own dynamics and not necessarily by other sectors, as mining, gaining terrain in exports. All in all, during the 80's the share of these products together was less than 5% and since the 90's it is completely negligible.

The 50's witnessed for the first time a considerable expansion of the *fishmeal* industry, which became the main export with a peak share of about 30% of total exports late in the 60's.¹⁶ The 70's is a period of sharp collapse in the sector such that it shrank to a share of 5% in the early-80's. The sector finally recovered from the-mid 80's onwards reaching a quantum comparable to that in the 70's and with a share of between 10% and 15% of total exports.

Another important export that also exhibits erratic movements in its share and quantum is *petroleum*. During the 40's and from the late-70's to the mid-80's, petroleum exports are particularly important, reaching about 20% of total exports. A major event in this industry is the sharp increase in its quantum by the late-70's, the average exported volume is about 5 times greater from 1980 to 2005 than from 1950 to 1975. This boost, however, had a temporary effect on the share (which is about 10% by the end of the sample) as other exports, especially minerals, expanded faster from the mid-80's.

[Figure 5 around here]

¹⁶ Figures for fishmeal also include exports of fishoil.

Throughout the period of analysis, the aggregate share of *mineral* exports has grown gradually, from 30% to 50%, but the individual contribution of different minerals is uneven. For instance, almost from scratch in the 90's gold reached and even beaten the champion since the 60's, copper, with a share of about 25%. However, taken together silver, zinc, iron ore and lead are more important than the main mineral (whichever it is); after observing Figures 4(c) and 4(d) it is needless to say that it is difficult to establish a steady ranking among these minor metals (whose share fluctuate individually around 10%).

2.2 Booms and shrinks

Figure 6 summarizes the main finding of the paper. It displays the booming and shrinking phases of each of the main primary export from 1940 to 2005 (using the methodology developed in Appendix B) and makes evident the non-overlapping booms or shrinks argument. A *boom* is defined as a period of at least 3 years where the trend of the real exported value of a given product grows at an average annual rate of 5% and its share of total export increases at least 2%. Similarly, the *shrinks* are periods of sustained (at least 3 years) fall of the trend of the real exported value along with a decrease of the share of at least 2%.¹⁷

[Figure 6 around here]

The most remarkable facts (that can also be inferred from the above discussion on Figures 4 and 5) are associated with the collapse of agricultural exports from the 60's on, the erratic dynamics of fishmeal and petroleum exports, and the mining booms. In the 60's the main crops, cotton and sugar, collapsed and while the shrink was occurring, a boom in the mining sector was in place and copper became the Peruvian main export. Simultaneously, fishmeal exports also boomed and through the 60's this product alternated the first place in the ranking with copper. The fishmeal sector collapsed in the 70's and the copper sector, though did not collapse, became stagnant. However, oil started to boom and in the early-80's it became the main export to collapse few years later, by the mid-80's. Other primary sectors, which were not necessarily among the first or second exports, also collapsed in the 80's and this generalized shrink coincides with the overall macroeconomic crisis. Afterwards, in the 90's the booming sector was gold, which became Peru's main export by 1998, along with the "new" (but unimportant) agricultural product, coffee, and later in the decade petroleum, copper and molybdenum also boomed.

The institutional traits of the country and exploitation policies are largely responsible for inducing this uneven cross-product behavior, mainly through its effect on investment in projects aimed to expand the exportable supply. The notorious collapses in agricultural products and fishmeal observed in the sample show these traits were often more important than the comparative advantage of the country, and the institutional changes were not reversed timely because a new product boomed. It is only when the country was left without more "star" or "savior" exports in the late 80's, that reforms that allowed them to recover took place.

¹⁷ We discuss the choice of these parameters in Appendix B. As we explain later – see Tables 2 and 5 – there are only 2 booms (cotton in 1944 and coffee in 1983) that last 4 years, the rest last 5 or more years. In the case of shrinks, there are 6 but the magnitude of the fall is large enough to be considered as an important event.

3 Booms, collapses and the non-overlapping hypothesis

In Table 2 we present the beginning and the end dates for the booms and shrinks we identified in Figure 6, and if applicable the end date of a preceding boom or shrink. To summarize the main features of a boom or a shrink, we also catalogue these events according to two criteria.

[Table 2 around here]

The first criterion is the effect that dominates the change in the export revenue: if the *quantity* effect – defined in Appendix B, equation (1) – is greater, we call the boom quantity-driven (*Q*); alternatively, when the *price* effect dominates, we call the boom price-driven (*P*). Additionally, we also consider cases in which the first part of the boom might be quantity-driven, even though at the end of the boom it appears as price-driven. In those cases we call the boom quantity and price driven (*X*).

The second criterion comes from a comparison to the global economy. If the boom implies that the country is increasing its global market share we call it a *comparative advantage* type boom (*CA*); if in spite of the boom the market share declines, we call it a *favorable market* type boom (*FM*). In the case of shrinks or collapses, if the fall coincides with a drop in market share we tag it *own collapse* (*OC*) whereas if the market share increases we dub it a *market collapse* (*MC*).

In this context, there are some general facts from Table 2 that we can document. Firstly, the vast majority of booms (17 out of 20) are due to comparative advantages, whereas in the cases of collapses 13 out of 17 are of the *OC* type. Besides, only 5 booms are exclusively price-driven (from the rest 7, are *Q* and 8 are *X*) and only 2 collapses can be attributed to drops in the international prices (in contrast to 16 quantity-driven). This result confirms the idea that the behavior of the primary exports depends heavily on the ability of the country to overcome supply-side constraints. By the same token, the main sources of the export performance are clearly domestic rather than external factors.

Secondly, from 1965 to the 90's the booms were either associated to favorable external markets (*FM*, as in the case of zinc, copper and lead) or came one or two years after a collapse (petroleum, silver, gold, coffee and fishmeal) so might be regarded, at least in their beginnings, as statistical "rebounds". Additionally, for a given product the beginning of a boom is distant enough from the end date of a previous one, so the former can be thought as an independent event from the latter. The only exception is the copper boom of 1965 that can be understood as the continuation of the boom that began in 1953 and ended in 1962. In the case of collapses, we observe that during the 80's the markets for copper, gold and silver were unfavorable (*MC*), whereas over the sample collapses are not immediately preceded either by previous booms or collapses. The remarkable exception is the fishmeal collapse that of 1970 which will be discussed later.

Next, we locate the booms and collapses in an historical perspective to explain their causes. For expositional convenience we split the sample in two periods, before and after the 90's. The reason of this decision is that the 90's began with major structural reforms that get back the economy to an orthodox scheme, encouraging the inflows of foreign capital and biased towards trade liberalization. This explains why the most important booms after the 90's come from large mining and oil projects.

3.1 Before the 90's

3.1.1 Agriculture

The agricultural sector, especially crops grown since colonial times as cotton and coffee, enjoyed some of the earlier booms, in the 40's and the early-50's. However, after this the sector suffered many long-lasting shrinks, in particular after the Agrarian Reform in 1969 aimed to improve distribution of the profits forcing prior owners to share ownership with workers. It is not the purpose of this study to analyze the particularities of this reform – a comprehensive balance of its consequences can be found in Kay (1982) – but only to highlight that its design led to the collapse of the traditional agriculture exports.

With the reform, modern agriculture enterprisers were transferred to the workers and by 1975 almost all large scale plantations were affected. Unsurprisingly, the speed of the reform contracted private investment in agriculture dramatically – which is one of the factors behind the drop in the investment rate shown in Figure 1(b) – so by the time the workers union took over, the most important plantations were undercapitalized. This fact, together with the limited managerial capacity of the new owners, made the sector lose much of the competitiveness offered by the country's comparative advantages (see the drop in the quantum in Figure 5) and by the subsequent achievement of economies of scale. Much of the land was fragmented into smaller and less productive plots due to a poor and improvised allocation of the property rights.

What follows is an unfortunate series of collapses in cotton and sugar, the capital-intensive crops of the 40's and 50's, until they virtually disappeared by the beginning of the 80's. The exception to the rule were coffee plantations which by the time of the reform were not as developed as those of sugar and cotton and therefore were not affected by it. This crop explains the late increase in the agriculture quantum (in the 90's), but its share in exports is negligible by the time of the recovery.¹⁸

3.1.2 Fishing

In the years following WWII, the Peruvian fishing industry was small and mainly oriented towards producing canned fish for export. In 1949, there were only 7 plants producing fishmeal. Responding to a growing world-wide demand for animal feed and a downturn in the Peruvian canning industry, investors began to pour into the industrial fishery during the mid-1950s and the sector quickly took off.¹⁹ Fishmeal output increased from 100,000 TM to 14 million TM between 1950 and 1972 and during the 60's Peru became the first fisher country of the world. This industry relied mostly on local entrepreneurs operating many small scale anchovy-processing plants, whose backward linkages stimulated Peruvian producers of technologically straightforward capital and intermediate goods

¹⁸ During the 90's a series of alternative, "non-traditional" crops have been developed with relative success. This is the case of asparagus and spices. The overall importance of these new products is still less than 8% of the exports by the end of the sample, though.

¹⁹ Following Smetherman and Smetherman (1973), an important factor for the boom to occur was that in 1959, the government lifted a decree that halted in the production of fishmeal until studies were made on the effects of the industry on the population of sea birds.

(fishing nets, vessels, and so on).²⁰

In 1970, the military government began the expropriation of anchovy fisheries and fishmeal factories. The literature is basically silent on the motives that led to this decision since, in contrast to enclave export activities as mining, about 75% of fishmeal exchange earnings were retained in the country and the industry displayed important training effects ranging from new entrepreneurs to boat building facilities. Presumably, with nationalization the state sought to better monitor the poorly regulated fishing activities by sorting out property right conflicts, i.e. to avoid a “tragedy-of-commons” situation.

However, regulation was late. The boom ended almost overnight and turned into a collapse, as the anchovies were overfished reaching its biological limit between 1972 and 1973 and a severe El Niño phenomenon occurred. Hoping to maintain the now jeopardized Peruvian leadership in world fishing, the government completely nationalized the anchovy fleet and processing plants and established PescaPeru. However, these efforts led only to a large drain on the government budget.

During the administration of Morales Bermúdez in 1976, after the sector failed to recover, a privatization process began with the sale of most of the PescaPeru’s fishing vessels (*bolicheras*) as well as important processing plants. Anchovy fishing was now closely regulated, but this could not stop the deep collapse of the sector until 1982 and the private sector demanded a new nationalization process. Nevertheless, these reforms started a new investment phase that could help explain the boom registered later in the 80’s. Consequently, after another El Niño phenomenon in 1983, the sector stroke back as the biomass recovered to its historical levels. Interestingly, in contrast to the stagnated aggregate primary sector of the 80’s, the fishmeal managed to sustain a new export boom although not as strong as two decades before (it took almost 30 years to reach a fishmeal quantum close to that of the mid-70’s). The partial private ownership of capital and the relatively small investment to catch anchovies and process fishmeal are the explanations for such an exception.

3.1.3 Mining

There is an important amount of booms and collapses in mining before the 90’s. Two important events can explain most of this behavior: the Mining Code of 1950 and the wave of nationalizations of large mining companies in the 70’s.

Before the 1950’s, the mining sector was relatively biased towards national capital – specialized in the exploitation of gold, silver, lead and zinc – but allowed the selected participation of foreign capital in some important fields, especially copper. In 1950, Odría’s administration enacted a new Mining Code that was extremely favorable to large foreign investors.²¹ The purpose of the code was to boost investment in the exploitation of copper but it would soon extend to a wide range of metals. An immediate consequence of the new legislation was an important inflow of foreign capital that

²⁰ This boom is amongst the longest we report and has been widely documented in the development literature. See Aguilar Ibarra *et al* (2000) and the references therein for a recent review.

²¹ The code replaced the payment of royalties scheme by taxes on utilities adjusted by capital depreciation and reserves exhaustion and guaranteed the investors tax stability for 25 years. Furthermore, it enacted an agreement with the USA to avoid double taxation of American companies and promoted tax benefits for the exploitation of high-risk or marginal projects. See Kuramoto (2001) for details.

explains the increase in the private investment rate during the 50's, depicted in Figure 1(b).²²

Metals exports grew from 21% of total exports in 1951 to over 40% a decade later. Moreover, Peru gained market share in most mineral products. In copper the Peruvian market share increased from 1.5% in 1950 to 6.7% in 1960, in silver from 9% to 19%, in zinc from 4% to 8%, and in lead from 4% to 7%. These booms were mostly quantity-driven and based on comparative advantages.

The early booms in the exports of zinc (1941 to 1950) and lead (1948 to 1954) are mostly associated to the growth and consolidation of a mining conglomerate. In 1915, after the merger of the Cerro de Pasco Mining Corporation, Cerro de Pasco Railway and Morococha, the Cerro de Pasco Cooper Corporation was formed. From then on and particularly during the 40's, a number of medium-scale mining firms sold their shares to the new company. Then in 1951, under the new Code, it became the giant Cerro de Pasco Corporation which is responsible for the first stage of the copper boom that began in 1953.

The largest projects that came along with the Mining Code were for copper and iron ore. Copper production more than tripled in 1960 with the opening of Southern Peru Copper Corporation's Toquepala mine after the completion of a 300 km rail line connecting the Toquepala concentrator plant with the port of Ilo. Southern Peru Copper Corporation became the first copper producer and exporter, helping the earliest boom we report to last until 1962. As for iron ore, in 1952 the Marcona Mining Company (a subsidiary of Utah Construction Company) was established and as a result the sector was responsible for one of the longest booms we report, between 1953 and 1968.

The mining booms changed their nature in the mid-60's. Even though production did not fall, Peru lose market share, mainly to the Soviet Union so the country became less competitive. For that reason, booms in that period were mostly price-driven and based on favorable market conditions. This is the case of long-lasting zinc boom from 1961 to 1975 and the copper boom from 1965 to 1969.

Nevertheless, the booms in lead, silver and gold in the late 60's and early-70's can be regarded as a result of the mining code of 1950. As argued, after it was enacted, there was an increase in investment in the sector, besides the consolidation process described above. Even though the code was enacted to allow the development of certain forms of mining in copper, its condition were favorable to other minerals and this was the case of these booming sectors. However, the 70's came with a program of nationalization by the military government in office since 1968. The only exception was the large copper project of Cuajone who was exploited by the Southern Peru Copper Corporation since 1969, with a major expansion in 1977.

In 1970 non-developed mining concessions by foreign firms were returned to the government and in 1971 state mining rights were assigned to Minerio Peru, the newly born state monopolist marketing arm for minerals. Then in 1973, the mining complex Cerro de Pasco Corporation along with La Oroya smelter was nationalized and "Empresa Minera del Centro del Peru" (Centromin Peru) was created. Finally, although the Marcona Mining Company got an extension of its concession until 1982 (and possibly 1984), it was expropriated in 1974 (which was a deliberate choice for

²² After the Mining Code, the sector was divided between the largest mines, which produced roughly two-thirds of metal output and owned by foreign firms, and the small-to-medium size mines, which supplied the remaining third of output and were under Peruvian ownership.

nationalization to serve as a political example of the regime's dedication to revolutionary ideas) and Hierro Peru was created.

As in the case of agriculture, the nationalizations were mostly expected so investment in new projects shrank considerably since the coup in 1968 (continuing with the downward trend that began in 1962) and thus when the state enterprisers got established their capitalization rates were far below competitive levels. This explains the increasing public investment rate we observe in Figure 1(b) since the beginning of the 70's and the increasing fiscal and current account deficit in Figure 1(c).

The efforts of the government to replace the flown capital in general prevented collapses in the mining sector, particularly copper (which opened some important mines as Cerro Verde in 1977) until the 80's. The most notorious exception is iron ore which under Hierro Peru's control collapsed from 1973 until 1990 due to a considerable production shrink. However, with large technological constraints and too costly investments in exploration, the state could not manage to engineer a boom either. As explained before, the short-lived silver boom and modest gold booms in the mid-70's are likely to be just statistical rebounds.

During the 80's some important mines were opened, as Tintaya in 1985, but slumping world prices, labor strife and the increasing macroeconomic mismanagement kept their production and those of older mines at low levels. Copper, gold and silver collapsed and the shrink in iron ore continued. Peru lost market share in these years and many of the mining state-run company almost went bankrupt during García's administration.

3.1.4 Petroleum

The oil sector was a classic example of the conflict between the advocates of nationalization and those that supported the presence of foreign companies because of its economic contributions.²³ The principal conflict was about events that took place as far back as 1825, and involved the main producer, the International Petroleum Company (IPC), a subsidiary of the Standard Oil of New Jersey. This conflict dominated the debate in the 60's and led to the events described below.

In the 50's under Odría's government, a new petroleum law was approved that was favorable to oil companies, and IPC took new concessions and invested in these new areas. Nevertheless, the described conflict was taking place, but with no resolution. Different settlements were proposed, but the nationalization proponents opposed them. Consequently, the status quo was that companies could operate, while the political conflict was unfolding.

This changed in 1968 with the military coup of Velasco. After that, oil extraction, refining, and domestic marketing of oil were under control of PetroPeru as IPC was expropriated. Output of oil products increased greatly in the course of the 70's, but mostly due to the investment made prior to 1968: its value at constant prices was 2.7 times as high in 1980 as in 1970. A particularly important event was the opening of the Northern Peruvian Oil Pipe in 1976. But then oil production joined the collective downtrend: it fell sharply between 1980 and 1985. The severe economic crises of the 80s and the increase in rural violence contributed to the decrease. Additionally controls on prices of oil products held them far below costs of production in the second half of the 80's. This fact put

²³ See Philip (1976) for a detailed description of this conflict.

PetroPeru deeply into deficit and constrained its ability to finance both production and exploration.²⁴

3.2 After the 90's

Major structural reforms were carried out in the 90's, attempting to revert the economic model of the past 3 decades that ended up in a traumatic macroeconomic crisis. One of the most important reforms is financial liberalization along with the privatization and restructuring of public enterprises. Under the umbrella of four laws promoting investment in mining and natural resources and dealing with foreign and private investment, more than 500 *Stability and Guarantee* contracts have been signed since 1993.²⁵

In the case of *mining*, the General Mining Law of 1992 made legal procedures to obtain mining rights easier, and amendments in 1996 guaranteed protections to mining ventures and contracts. Besides, the sector exclusively received tax benefits in the form of an anticipated devolution of the added value taxes. These laws have ensured more favorable exploration and production contract terms for investors. Hierro Peru was the first public company to be privatized in 1992, bought by the Chinese Shougang Corporation. The privatization and concessions of Minero Peru and Centromin deposits began in 1994. As a first attempt, the privatization of Centromin was promoted as an integrated corporation but no bids were submitted. Since then the giant has been privatized gradually in a number of sales and concessions. By the late 90's, most of the corporation was transferred to the private sector.

The fresh investment flows brought by the private sector in exploration and exploitation as privatization evolves, allowed new mining booms in the 2000's. The first one was gold which was quantity-driven. Though formally started in 1989, this was mostly due to the fact that exports from the sector almost disappeared in 1987 so the first part of the boom is a statistical rebound. After the resolution of the ownership problems of the Yanacocha mine, one of the most profitable gold mines in the world, exports grew substantially even disputing the main export position with copper. By 1995 Peru represented 2% of the global market share, this figure increased to 5% in 2000 and 8% in 2005.

Then we observe an important boom in copper and its main byproduct, molybdenum. An important factor here is that in 1996 the Antamina project is sold and it begins its operations in 2001, which quickly became the seventh-largest producer of copper in the world and almost share the leadership in copper exports with the Southern Peru Copper Corporation, who also completed an important expansion of the Toquepala mine in 2001.

In the *petroleum* sector, the major changes were introduced in 1991 in the form of invitations for new investment by foreign oil companies, ending the monopoly position of PetroPeru. Several foreign oil companies immediately entered negotiations to begin exploration activities, either independently or in collaboration with PetroPeru. The Peruvian oil production has doubled in the period. Nevertheless, the relatively unfavorable market conditions in the aftermath of the Persian

²⁴ Foreign firms have been allowed to participate in exploration for new fields, although negotiations over their rights often has proved to be difficult. One foreign firm, Belco Petroleum Corporation, maintained offshore production until 1985, when its operations were nationalized after a dispute over taxes with the García's administration.

²⁵ A comprehensive review of the privatization process can be found in Paliza (1999).

Gulf War disguised this increase, so once the international price of oil boosted in the 2000's, the sector boomed.²⁶

3.3 Overlapping of booms and shrinks? A closer look

The facts presented in the figures and tables of the previous section depict our argument on non-overlapping booms. Table 3 summarizes them by showing the pairwise correlations between booming indicator variables. These are defined as $D_t = 1$ if the conditions for a booming phase hold in period t and $D_t = 0$ otherwise, and are displayed as solid lines in Figure 6.

[Table 3 around here]

A negative figure in the table implies that if a product is booming, the corresponding pair is not booming (either shrinking or exhibiting an average behavior). By construction a correlation between the booming indicator of products A and B equal to, say, -0.4 tells us that 40% of the time A is not booming, product B is experiencing a boom. Similarly, if the correlation is 0.4 , this would imply that 40% of the time A is booming, so is B . Note that the converse interpretation is true by definition, $\text{corr}(D^A, D^B) = \text{corr}(D^B, D^A)$.

There are many significant correlations in Table 3 with most of the positive correlations (which are 9 out of 22) are associated to the sectors that boomed in the 40's and 50's. Nevertheless, a slim majority of the correlations there (13 out of 22) are negative. For instance, fishmeal presents significantly negative correlations with gold, silver and especially petroleum. Gold also had significant negative correlations with iron ore, lead and zinc. By its part, oil had negative significant correlations, apart from fishmeal, with coffee, iron ore and zinc. These representative correlations provide a first piece of supporting evidence to the non-overlapping booms argument.

[Table 4 around here]

As for the overlap of booms and shrinks of different products, Table 4 displays pairwise correlations between the indicator of booming occurrences (D_t) of one product and the indicator of shrinking occurrences of another ($d_t = 1$ if the conditions for a shrink hold in period t and $d_t = 0$ otherwise, the crosses in Figure 6). A positive correlation in this table indicates that while one product is booming the corresponding pair is shrinking, and viceversa. It is worth-mentioning that the computations are no longer symmetric, $\text{corr}(d^A, D^B) \neq \text{corr}(d^B, D^A)$, so the upper and lower triangle of the correlation matrix have different (but close for our purpose) interpretations.

In that table there are 31 correlations that are significant at a 5% level. Of those 18 are positive. Again, most of the negative correlations – which suggest that booming phases occurred when there was no collapse on the other sectors – are in those products that boomed together in the 40's and 50's. On the other hand the positive correlations – which suggest that booming phases occurred when

²⁶ It is important to mention that Peru is not yet self-sufficient in oil (it exports crude oil, but imports oil derivatives), but new oil discoveries would change this situation by 2010. However, these conditions led to the discovery of the Camisea gas field, which might lead eventually to gas exports.

there was a collapse on the other sectors – are similar to those explained in Table 3. If we compare the proportions of correlations in Table 3 that are negative, with respect to the total significant correlations of Table 4, we find that they are almost identical, 59% and 58%, respectively. This suggests that is not only that most booms do not overlap, but also that in most cases we observe the overlapping of a boom in one good with the shrink or collapse in another.

4 Concluding remarks

It has been widely argued that a diversified export basket has positive effects on growth and development as it could work as insurance for volatile terms of trade. Nevertheless, the Peruvian experience could prove that there might be cases where this needs not to hold. Peru has a particularly favorable and diversified resource endowment and many comparative advantages in the exploitation of agricultural products, fishing activities as well as mining. Nevertheless, this wealth has not been the base of economic development.

In this paper we have argued that different booms in each resource sector, led the authorities to take some policy decisions, somehow myopically, that were ex-post harmful for the Peruvian economy. Probably, the most remarkable one is the wave of expropriations in the primary sector and its subsequent management by public enterprisers. The rationale behind these expropriations is hard to support from an economic point of view, since a less interventionist and more standard approach – which involves no expropriations – would have rendered better results in terms of economic growth: increase debt and pay it back with increasing taxes on the primary sectors.²⁷

It should be expected that once this expropriation occurs, if the sector is not managed soundly by the government it is bound to collapse. However, the collapses did not imply a change of policy direction that could have reversed the negative consequences of the expropriation. This was to a great extent due to the particularly favorable endowment previously described, which allowed a new sector to boom while another was collapsing and consequently gave policy-makers degrees of freedom to delay reform. Indeed, it took almost 20 years to carry out the structural reforms that have allowed the primary sector to significantly expand, since the time the managerial capacity of the government proved limited, the mid-70's.

The conclusion we can draw from our analysis is that policy-making is more challenging in a country that is endowed with many different resources than it would appear at first sight. Booms in a sector can hide declines in others, giving a fake impression of prosperity and delaying necessary responses to the declining industries. Therefore, countries as Peru need an even better institutional setting than what could be sufficient for a single-good exporter. Without it, the blessing of a wide natural resource wealth could turn out to be a curse, hindering the achievement of effective and inclusive growth policies.

²⁷ Furthermore, the fact that contracts could be renegotiated does not justify outright expropriation. There are justifications to renegotiate contracts, particularly with regards to non-renewable resources. First, fiscal rules and contracts most probably were done without taking into account that there could be a favorable market environment that would lead to higher prices. Additionally, in most cases, there could have been geological uncertainty and therefore the ex-post realization of the productivity of the sector was not known ex-ante (Manzano and Monalid, 2008).

References

- Acemoglu, Daron and Fabrizio Zilibotti, "Was Prometheus Unbound by Chance? Risk, Diversification, and Growth", *Journal of Political Economy*, 105(4), 1997, pp. 709-751.
- Aguilar Ibarra, Alonso, Chris Reid and Andy Thorpe, "The Political Economy of Marine Fisheries Development in Peru, Chile and Mexico", *Journal of Latin American Studies*, 32(2), 2000, pp. 503-527.
- Blomstrom, Magnus and Ari Kokko, "From Natural Resources to High-Tech Production: The Evolution of Industrial Competitiveness in Sweden and Finland", in Lederman, Daniel and William Maloney (eds.), *Natural Resources and Development: Neither Curse nor Destiny*, Stanford: Stanford University Press and The World Bank, 2007.
- Dancourt, Oscar, "Neoliberal Reforms and Macroeconomic Policy in Peru", *CEPAL Review*, 67, 1999, pp. 51-73.
- De la Cuba, Mauricio and Arturo Ormeño, "La Volatilidad del Sector Primario Exportador: Una Aproximación al Caso Peruano", *Estudios Económicos*, No. 9, 2003, Central Bank of Peru, pp. 149 - 172.
- Hausmann, Ricardo and Roberto Rigobon, "An Alternative Interpretation of the 'Resource Curse': Theory and Policy Implications", in Davis, Jeffrey M., Rolando Ossowski and Annalisa Fedelino (eds.), *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*, Washington DC: IMF, 2003.
- Hofman, André A., *The Economic Development of Latin America in the Twentieth Century*, London: Edward Elgar Publishing, 2000.
- Imbs, Jean and Romain Wacziarg, "Stages of Diversification", *American Economic Review*, 93(1), 2003, pp. 63-86.
- Jaquette, Jane S. and Abraham F. Lowenthal, "El Experimento Peruano en Retrospectiva", Documento de Trabajo 19, Serie Sociología/ Política 4, Instituto de Estudios Peruanos, 1986.
- Kay, Cristobal, "Achievements and Contradictions of the Peruvian Agrarian Reform", *Journal of Development Studies*, 18 (2), 1982, pp. 147 - 170.
- Kuramoto, Juana R., "Las Aglomeraciones Mineras en Perú", in Buitelaar, Rudolf M. (ed.), *Agglomeraciones Mineras y Desarrollo Local en América Latina*, Bogotá: United Nations, 2001, Chapter VI, pp. 139-158.
- Ledermann, Daniel and William F. Maloney, "Trade Structure and Growth", Policy Research Working Paper 3025, World Bank, 2003.
- Lederman, Daniel and William Maloney (eds.), *Natural Resources and Development: Neither Curse nor Destiny*, Stanford: Stanford University Press and The World Bank, 2007.
- Maloney, William F., "Missed Opportunities: Innovation and Resource-Based Growth in Latin America", *Economía*, 3(1), 2002, pp 111-151.
- Manzano, Osmel and Francisco Monalid, "The Political Economy of Oil Production in Latin America", *Economía*, 9(1), 2008, pp. 59-98.

- Morón, Eduardo, María Bernedo, Jorge F. Chávez, Antonio Cusato and Diego Winkelried, *Tratado de Libre Comercio con los Estados Unidos: Una Oportunidad Para Crecer Sostenidamente*, Lima: Universidad del Pacífico Press - Insituto Peruano de Economía, 2005.
- Paliza, Rosendo, “Impacto de las privatizaciones en el Perú”, *Estudios Económicos*, No. 4, 1999, Central Bank of Peru, pp. 9 - 37.
- Parodi, Carlos, *Perú 1960 - 2000: Políticas Económicas y Sociales en Entornos Cambiantes*, Lima: Universidad del Pacífico Press, 2000.
- Philip, George, “The Limitations of Bargaining Theory: A Case Study of the International Petroleum Company in Peru”, *World Development*, 4(3), 1976, pp. 231-239.
- Portocarrero, Felipe, Arlette Beltrán and María E. Romero, *Compendio Estadístico del Perú: 1900 - 1990*, Lima: Universidad del Pacífico Press, 1991.
- Prebisch, Raúl, “The Economic Development of Latin America and its Principal Problems”, reprinted in *Economic Bulletin for Latin America*, (7) 1, 1962, pp. 1-22.
- Sachs, Jeffery, 2007, “How to handle the macroeconomics of oil wealth”, in Humphresy, M., J. Sachs and J. Stiglitz (eds.), *Escaping the Resource Curse*, New York: Columbia University Press, 2007.
- Sachs, Jeffrey and Andrew Warner, “Natural Resource Abundance and Economic Growth”, NBER Working Paper 5398, NBER, 1995.
- Salter, Wilfred E. G., “Internal and External Balance: The Role of Price and Expenditure Effects”, *Economic Record*, 53, 1959, pp. 226-238
- Smetherman, Bobbie B. and Robert M. Smetherman, “Peruvian Fisheries: Conservation and Development”, *Economic Development and Cultural Change*, 21(2), 1973, pp. 338-351.
- Stijns, Jean-Philippe, “An Empirical Test of the Dutch Disease Hypothesis using a Gravity Model of Trade”, mimeo, UC Berkley, 2003.
- Thorp, Rosemary, “The Post-Import-Substitution Era: The Case of Peru”, *World Development*, 5(1-2), 1977, pp. 125-136.
- Thorp, Rosemary, “Trends and Cycles in the Peruvian Economy”, *Journal of Development Economics*, 27(1-2), 1987, pp. 355-337.
- Thorp, Rosemary, *Economic Management and Economic Development in Peru and Colombia*, Basingstoke: Macmillan and the OECD Development Centre, 1991.
- Thorp, Rosemary, “A Reappraisal of the Origins of the Import-Substituting Industrialisation 1930 – 1950”, *Journal of Latin American Studies*, 24(Supplement), 1992, pp. 181-195.
- Thorp, Rosemary and Geoffrey Bertram, *Peru 1890 - 1977. Growth and Policy in an Open Economy*, London: Macmillan, 1978.
- Wright, Gavin and Jesse Czelusta, “Resource based Growth: Past and Present”, in Lederman, Daniel and William Maloney (eds.), *Natural Resources and Development: Neither Curse nor Destiny*, Stanford: Stanford University Press and The World Bank, 2007.

A Data sources

Data on National Accounts (Real GDP, real exports, investment rates, imports, fiscal and external deficit) from 1950 to 2005 and on the trade balance (disaggregated exports which includes volumes, prices and traded values) from 1980 to 2005 come from the Central Bank of Peru. Data on the trade balance prior to 1980 come from Portocarrero *et al* (1991).

Population data to compute per capita figures are from the National Institute of Statistics and Informatics (INEI). International traded values to compute the Peruvian trade share for the various products are from the World Bank's *World Development Indicators* for minerals and petroleum, and from the Food and Agriculture Organization of the United Nations FAO's database for agricultural products and fishmeal.

Data from Latin American countries in Figure 3(b) come from De la Cuba and Ormeño (2003).

B Methodological issues

Next, we present the methodology used to identify booms and collapses and to decomposed them into price and quantity effects. The results are shown in Tables 5, 6 and 7 in Appendix C. Figure 6 and Table 2 in the main text built upon these tables.

B.1 Identifying booming and shrinking phases

To identify booming and shrinking phases of a given export good we have developed an algorithm that seeks to track its absolute and relative (in comparison to other exports) evolution. We say that an export is *booming* if its real per capita value increases in a significant and sustainable fashion, and if this rise makes the good gain relative importance in the export supply of the country.

The algorithm consists on two steps: identification and "pruning". Let X_t be the export value of a given good in period t , s_t be its the share on total exports in period t , and let X_t^r be the per capita, real value of X_t . For the identification step, call \tilde{z}_t a smooth trend of variable z_t (here, a centered three-year moving average) so we say period t is part of a booming phase if...

... $\tilde{X}_t^r > \tilde{X}_{t-1}^r$, so the per capital real exported value increases, and

... $\tilde{s}_t > \tilde{s}_{t-1}$, so the good increases its importance relative to other exports.

As it stands, this first step would incorrectly identify as booms increases in the exported value that are sporadic (i.e., not sustained) or that causes a modest increase in the export share s_t (i.e., not significant). Thus, in the second step we fine-tune or "prune" the periods delivered in the first step and restrict our attention to booming phases that...

... last at least 3 years,

... are associated with an average growth rate of X^r of at least 5%, and

... induce an increase in the export share, s , of at least 2%.

An analogous definition is used for shrinking phases: an export is *shrinking* if its real per capita value decreases in a significant and sustainable fashion, and if it loses importance in the export supply. The criteria (in both steps of the algorithm) for shrinking phases are the following:

- ... $\tilde{X}_t^r < \tilde{X}_{t-1}^r$, so the per capital real exported value decreases,
- ... $\tilde{s}_t < \tilde{s}_{t-1}$, so the good loses its importance in the export supply of the country,
- ... the phase lasts at least 3 years, and
- ... the phase induces a decrease in the export share, s , of at least 2%.

Needless to say, the above algorithm is more intuitive than rigorous. However, it seems to work well in our small sample as it renders results that are easy to reconcile with the historical evidence and facts on the evolution of the Peruvian exports.²⁸ Besides, the parameters in the “pruning” step come from a preliminary analysis of the data. The average growth in the per capita real value of primary exports in the sample (1940 – 2005) is about 2.7%, so the 5% threshold seems reasonable in defining a boom; similarly, the average change in the export share of the main exports is at most the 2% we use to discriminate phases from typical movements in the export shares.

B.2 Price and quantity effects

To decompose the total change in the exported value (ε_X) during a booming or shrinking phase into its price and quantity effect, we follow a somewhat established procedure (see De la Cuba and Ormeño, 2003). Let $t = \text{start}$ denote the date at which a phase starts, and $t = \text{end}$ the date at which it ends. Also let P_t be the price and Q_t the quantity so $X_t = P_t Q_t$ is the exported value. Thus, the price (ε_P) and quantity (ε_Q) effects are given by

$$\varepsilon_X = \frac{X_{\text{end}} - X_{\text{start}}}{\mathbf{X}_{\text{start}}} = \frac{Q_{\text{end}}(P_{\text{end}} - P_{\text{start}})}{\mathbf{X}_{\text{start}}} + \frac{P_{\text{start}}(Q_{\text{end}} - Q_{\text{start}})}{\mathbf{X}_{\text{start}}} = \varepsilon_P + \varepsilon_Q, \quad (1)$$

where, for expositional reasons, the effects are expressed in terms of the total exports at the beginning of the phase, $\mathbf{X}_{\text{start}}$.

Table 6 also displays the quantity and price effects within a boom phase. To compute this figures, we find the midpoint in the interval $t \in [\text{start}, \text{end}]$, call it $t = \text{mid}$. Then, we suitably redefined the start and end dates in equation (1), for the first ($t \in [\text{start}, \text{mid}]$) and the second ($t \in [\text{mid}, \text{end}]$) halves of the boom.

²⁸ We also tried alternative ways to identify the booming and shrinking phases, mainly coming from the business cycle literature as the Bry-Boschan algorithm. The results were in general robust to the choice of the procedure followed.

TABLE 1. Real exchange rate (RER) and non-primary exports

	1940's	1950's	1960's	1970's	1980's	1990's
Average RER (1980 = 100)	126.0	91.4	110.9	118.2	88.9	266.8
Standard deviation of RER	15.3	6.0	16.7	12.7	16.8	28.0
Non-primary exports (%)	9.5	11.6	7.2	11.8	25.1	30.4

TABLE 2. Booms and collapses †

Booms						Collapses					
	Dates	(1)	(2)	(3)	(4)		Dates	(1)	(2)	(3)	(4)
Zinc	1941 – 1950	X	CA		41.4	Gold	1941 – 1945	Q	OC		3.5
Cotton	1944 – 1947	X	CA		39.1	Sugar	1947 – 1950	P	–		10.6
Lead	1948 – 1954	Q	CA		7.2	Gold	1948 – 1953	Q	OC	1945 ^c	7.0
Coffee	1949 – 1961	Q	CA		25.5						
Copper	1953 – 1962	Q	CA		18.2						
Iron ore	1953 – 1968	Q	CA		16.0						
Fishmeal	1954 – 1969	Q	CA		20.3						
						Petroleum	1957 – 1970	Q	OC		9.3
						Gold	1959 – 1972	Q	OC	1953 ^c	100
Zinc	1961 – 1975	X	FM	1950 ^b	15.4	Sugar	1963 – 1968	Q	OC	1950 ^c	0.2
Copper	1965 – 1969	P	FM	1962 ^b	15.9	Cotton	1964 – 1978	Q	OC	1947 ^b	3.4
Lead	1967 – 1973	P	FM	1954 ^b	15.5	Silver	1967 – 1972	Q	MC		5.1
Petroleum	1972 – 1981	X	CA	1970 ^c	59.8	Fishmeal	1970 – 1982	Q	OC	1969 ^b	2.2
Silver	1973 – 1977	P	CA	1972 ^c	25.0	Iron ore	1973 – 1990	Q	OC	1968 ^b	0.7
Gold	1974 – 1983	X	CA	1972 ^c	36.8	Sugar	1974 – 1982	Q	OC	1968 ^c	22.4
						Coffee	1979 – 1982	Q	OC	1961 ^b	17.5
						Copper	1980 – 1983	P	MC	1969 ^b	12.4
Coffee	1983 – 1986	P	CA	1982 ^c	24.0	Cotton	1983 – 1986	Q	OC	1978 ^c	3.4
Fishmeal	1983 – 1994	Q	CA	1982 ^c	21.0						
						Gold	1984 – 1987	Q	MC	1983 ^b	65.6
						Silver	1984 – 1989	Q	MC	1977 ^b	13.1
						Petroleum	1985 – 1989	Q	OC	1981 ^b	19.5
Gold	1989 – 2005	Q	CA	1987 ^c	53.0	Cotton	1991 – 1994	Q	OC	1986 ^c	45.3
Coffee	1993 – 1997	P	CA	1986 ^b	45.9						
Molybdenum	2000 – 2005	X	CA		80.6						
Copper	2001 – 2005	X	CA	1983 ^c	27.8						
Petroleum	2001 – 2005	X	CA	1989 ^c	30.5						

Notes:

† Based on calculations in Appendix C.

(1) *P* = Price effect dominates, *Q* = Quantity effect dominates, *X* = Both effects are important.(2) For booms: *CA* = Comparative advantage, *FM* = Favorable market.For collapses: *OC* = Own collapse, *MC* = Market collapse.(3) Date when the latest event, either a boom (marked with a *b*) or a collapse (marked with a *c*), ended.

(4) For booms [collapses], average annual rate of growth [decrease] of the exported value.

TABLE 3. Correlation matrix of booming occurrences

	Coffee	Fishmeal	Copper	Gold	Silver	Lead	Iron ore	Zinc	Petroleum
Coffee	*	0.303		-0.216	-0.223		0.275	-0.353	-0.383
Fishmeal		*	0.368	-0.278	-0.246		0.587		-0.466
Copper			*	-0.213	-0.208		0.704		
Gold				*	0.228	-0.432	-0.471	-0.523	0.505
Silver					*				0.528
Lead						*		0.359	
Iron ore							*		-0.307
Zinc								*	
Petroleum									*

Note: Only significant correlations at a 5% level are displayed. Bold-faced figures are negative.

TABLE 4. Correlation matrix of booming and shrinking occurrences

	Coffee	Fishmeal	Copper	Gold	Silver	Lead	Iron ore	Zinc	Petroleum
Coffee	*	-0.350							
Fishmeal	-0.218	*			0.311				0.673
Copper		-0.327	*				-0.404		0.382
Gold	0.305	0.285	0.305	*	-0.312		0.321		-0.461
Silver		0.578		-0.253	*		0.468		
Lead				0.437	0.332	*	-0.235		
Iron ore		-0.280		0.283			*		0.577
Zinc	-0.218		-0.218	0.567			-0.268	*	0.213
Petroleum	0.317	0.640		-0.407			0.399		*

Notes: Only significant correlations at a 5% level are displayed. Bold-faced figures are positive.

Figures in the upper [lower] triangle are pairwise correlations between booming phases of the row [column] product with shrinking phases of the column [row] product.

TABLE 5. Export booms: Growth rates and shares

Product	Dates	$n^{(1)}$	During the boom ⁽²⁾					Before the boom ⁽³⁾		After the boom ⁽³⁾	
			g_X	g_P	g_Q	s_{start}	s_{end}	g_{pre}	s_{pre}	g_{post}	s_{post}
Cotton	1944 – 1947	4	39.1	15.1	20.9	12.9	22.5	-17.8	16.3	-6.1	30.2
Coffee	1949 – 1961	13	25.5	-5.3	32.4	0.0	4.5	-39.4	0.1	9.1	4.5
	1983 – 1986	4	24.0	14.9	7.9	3.4	10.7	-7.3	3.4	-4.4	5.0
	1993 – 1997	5	45.9	26.9	15.0	2.0	5.8	-4.4	2.7	13.8	4.7
Copper	1953 – 1962	10	18.2	-0.2	18.3	7.0	16.6	-5.0	6.0	-0.2	15.4
	1965 – 1969	5	15.9	13.4	2.2	15.1	29.5	-1.6	15.8	-0.1	22.3
	2001 – 2005	5	27.8	18.9	7.5	13.4	19.5	4.9	13.2		
Gold	1974 – 1983	10	36.8	11.4	22.8	0.0	2.3			-12.6	1.8
	1989 – 2005	17	53.0	1.3	51.0	0.1	18.2	-63.9	0.1		
Silver	1973 – 1977	5	25.0	13.1	10.6	3.4	6.7	-16.2	2.9	-3.7	5.9
Lead	1948 – 1954	7	7.2	-2.4	9.8	6.3	9.3	-8.0	4.5	4.3	9.5
	1967 – 1973	7	15.5	12.7	2.5	4.4	7.2	3.0	4.9	-4.6	7.8
Iron ore	1953 – 1968	16	16.0	0.5	15.4	0.0	8.1			13.8	7.2
Molybdenum	2000 – 2005	6	80.6	55.4	16.2	0.4	6.7	13.8	0.4		
Zinc	1941 – 1950	10	41.4	24.8	13.4	0.3	5.2			-6.4	6.0
	1961 – 1975	15	15.4	11.2	3.7	3.8	12.2	5.8	4.0	3.4	11.2
Fishmeal	1954 – 1969	16	20.3	-5.4	27.1	3.1	24.5	8.5	2.9	-6.7	34.5
	1983 – 1994	12	21.0	-1.5	22.8	6.8	17.6	-4.9	5.3	-5.0	14.9
Petroleum	1972 – 1981	10	59.8	26.2	26.7	0.6	21.2	-17.7	0.7	0.9	19.7
	2001 – 2005	5	30.5	19.5	9.3	5.5	8.6	-10.9	4.5		
Agriculture	1941 – 1945	5	14.0	18.5	-3.8	28.5	53.6			-4.9	58.0
	1994 – 1997	4	17.5	7.1	9.8	2.2	6.8	-15.3	3.7	7.5	5.0
Main minerals	1953 – 1968	16	16.4	4.1	11.8	8.8	28.0	-4.3	7.9	-1.4	27.0
	1989 – 2005	17	13.4	1.6	11.7	22.9	37.7	-4.1	20.5		
Other minerals	1942 – 1957	16	23.3	13.2	8.9	5.5	25.9			3.6	23.8
	1963 – 1967	5	10.6	6.1	4.3	17.4	23.4	10.3	19.9	2.3	23.2
	2002 – 2005	4	30.2	22.5	6.3	14.9	18.6	10.0	16.1		
Non-traditional	1949 – 1953	5	10.7	0.2	10.5	9.6	12.0	-2.5	8.2	8.3	12.6
	1969 – 1980	12	28.0	9.5	16.9	4.0	21.4	-12.8	4.8	-7.3	21.9

Notes:

- (1) n is the length in years of the booming phase.
- (2) g_z ($z = X, P, Q$) is the average growth rate of z , $g_z = 100[(z_1/z_0)^{1/n} - 1]$.
 s_τ ($\tau = \text{start, end}$) is the share on total exports in period τ , $s_\tau = 100(X_\tau/\mathbf{X}_\tau)$.
- (3) g_{pre} and g_{post} are the average growth rate of per capita real exports 5 years prior or after the boom.
 s_{pre} and s_{post} are the average shares 5 years prior or after the boom, respectively.

TABLE 6. Export booms: Price and quantity effects

Product	Dates	Whole boom ⁽¹⁾			First half of the boom ⁽¹⁾			Second half of the boom ⁽¹⁾		
		$g_X^{(2)}$	$\varepsilon_P^{(3)}$	$\varepsilon_Q^{(3)}$	$g_X^{(2)}$	$\varepsilon_P^{(3)}$	$\varepsilon_Q^{(3)}$	$g_X^{(2)}$	$\varepsilon_P^{(3)}$	$\varepsilon_Q^{(3)}$
Cotton	1944 – 1947	39.1	17.7	12.5	53.2	1.0	13.8	-17.1	7.3	-10.4
Coffee	1949 – 1961	25.5	-7.9	15.2	31.2	-0.4	2.7	16.1	-6.1	5.3
	1983 – 1986	24.0	3.9	1.4	4.1	0.6	-0.3	35.1	2.9	4.1
	1993 – 1997	45.9	8.2	1.8	68.3	4.6	2.1	11.5	2.4	2.0
Copper	1953 – 1962	18.2	-0.6	33.5	7.1	-1.4	4.5	35.8	9.8	24.8
	1965 – 1969	15.9	17.7	2.1	16.9	9.2	1.7	9.3	7.7	8.2
	2001 – 2005	27.8	27.7	6.1	8.5	1.8	2.1	38.7	19.6	23.1
Gold	1974 – 1983	36.8	3.0	1.3	41.5	0.3	0.6	39.6	0.7	1.5
	1989 – 2005	53.0	17.7	71.9	82.1	-1.1	15.3	22.6	11.6	38.7
Silver	1973 – 1977	25.0	4.8	2.2	34.3	3.6	1.2	8.0	0.3	1.8
Lead	1948 – 1954	7.2	-2.7	8.3	12.8	1.3	4.2	0.1	-2.7	0.0
	1967 – 1973	15.5	6.1	0.7	21.2	4.3	0.2	6.2	0.9	1.6
Iron ore	1953 – 1968	16.0	2.3	24.8	22.8	-1.3	13.0	8.2	1.9	6.3
Molybdenum	2000 – 2005	80.6	15.4	0.7	24.8	0.3	0.2	129.9	10.8	11.6
Zinc	1941 – 1950	41.4	12.1	1.1	49.1	2.3	0.4	26.7	3.8	4.7
	1961 – 1975	15.4	25.5	2.7	8.1	1.5	1.8	21.0	14.4	15.2
Fishmeal	1954 – 1969	20.3	-120.0	200.3	23.4	-68.4	87.8	8.6	7.7	18.7
	1983 – 1994	21.0	-5.3	28.3	28.2	1.4	7.6	10.2	-3.7	9.8
Petroleum	1972 – 1981	59.8	67.3	6.6	52.5	3.9	1.0	68.3	25.8	37.7
	2001 – 2005	30.5	12.4	3.1	16.6	2.2	1.0	33.6	7.3	9.5
Agriculture	1941 – 1945	14.0	41.9	-6.7	-10.5	1.3	-12.1	39.1	43.2	49.4
	1994 – 1997	17.5	2.5	2.5	18.5	-0.6	2.8	26.3	3.3	2.9
Main minerals	1953 – 1968	16.4	48.5	45.3	21.3	0.2	33.4	10.3	22.9	25.0
	1989 – 2005	13.4	42.8	120.9	8.5	-6.8	30.5	16.9	31.4	71.8
Other minerals	1942 – 1957	23.3	96.6	11.4	45.4	70.5	3.8	13.7	14.5	27.8
	1963 – 1967	10.6	8.0	4.4	15.6	8.1	2.2	2.3	-0.8	1.7
	2002 – 2005	30.2	23.1	4.0	8.8	2.0	0.7	23.2	5.3	8.7
Non-traditional	1949 – 1953	10.7	0.1	3.6	24.3	-0.2	5.4	-4.7	0.3	-1.7
	1969 – 1980	28.0	63.7	27.4	26.4	7.1	8.2	43.7	26.2	56.1

Notes:

- (1) For the whole boom the initial and final periods are given in the column “Dates”. For the first [second] half the initial [final] period is displayed in column “Dates” whereas the final [initial] period is given by the midpoint of the interval in “Dates”.
- (2) g_X is the average annual growth rate of the value of exports in each period.
- (3) ε_P and ε_Q are the price and quantity effects explained in equation (1) in p. 22. Numbers in **bold** indicate which effect dominates.

TABLE 7. *Export collapses: Growth rates, shares and price and quantity effects*

Product	Dates	n	Growth rates and shares					Effects	
			g_X	g_P	g_Q	s_{start}	s_{end}	ε_P	ε_Q
Cotton	1964 – 1978	15	-5.7	6.7	-11.6	16.4	1.9	3.4	-11.2
	1983 – 1986	4	-3.4	8.4	-10.9	2.5	1.5	0.4	-0.5
	1991 – 1994	4	-45.3	-2.1	-44.1	1.3	0.1	-0.0	-1.5
Sugar	1947 – 1950	4	-10.6	-10.2	-0.5	29.7	15.0	-10.3	-0.6
	1963 – 1968	6	-0.2	5.1	-5.1	9.7	7.4	2.9	-3.1
	1974 – 1982	9	-22.4	-2.4	-20.5	7.0	0.6	-0.3	-11.2
Coffee	1979 – 1982	4	-17.5	-7.3	-11.0	8.2	3.4	-1.1	-2.4
Copper	1980 – 1983	4	-12.4	-8.4	-4.4	18.6	14.6	-4.7	-3.1
Gold	1941 – 1945	5	-3.5	11.0	-13.0	9.4	4.1	2.3	-3.3
	1948 – 1953	6	-7.0	1.1	-8.0	4.5	1.5	0.1	-1.3
	1959 – 1972	14	-100.0	11.4	-100.0	3.4	0.0	0.0	-0.7
	1984 – 1987	4	-65.6	-1.8	-65.0	2.3	0.0	-0.0	-2.1
Silver	1967 – 1972	6	-5.1	2.0	-6.9	5.3	3.4	0.5	-2.1
	1984 – 1989	6	-13.1	-6.5	-7.1	12.9	2.8	-1.5	-2.5
Iron ore	1973 – 1990	18	-0.7	4.4	-4.8	7.1	1.8	2.8	-3.5
Fishmeal	1970 – 1982	13	-2.2	4.6	-6.6	24.5	7.6	11.0	-19.4
Petroleum	1957 – 1970	14	-9.3	-2.9	-6.6	7.4	0.7	-1.1	-5.0
	1985 – 1989	5	-19.5	-9.9	-10.6	19.6	6.2	-4.9	-9.1
Agriculture	1949 – 1954	6	-6.3	0.6	-6.8	48.0	41.3	1.3	-18.2
	1963 – 1970	8	-1.7	5.0	-6.3	31.5	15.2	9.1	-13.2
	1975 – 1979	5	-2.4	22.6	-20.4	21.5	8.8	15.7	-18.9
Other minerals	1984 – 1987	4	-6.3	-3.3	-3.1	35.8	25.4	-3.1	-3.3
Non-traditional	1964 – 1968	5	-8.7	1.8	-10.3	8.4	4.0	0.4	-3.2

Note: See notes to Tables 5 and 6.

FIGURE 1. Political regimes, investment, twin deficit and growth

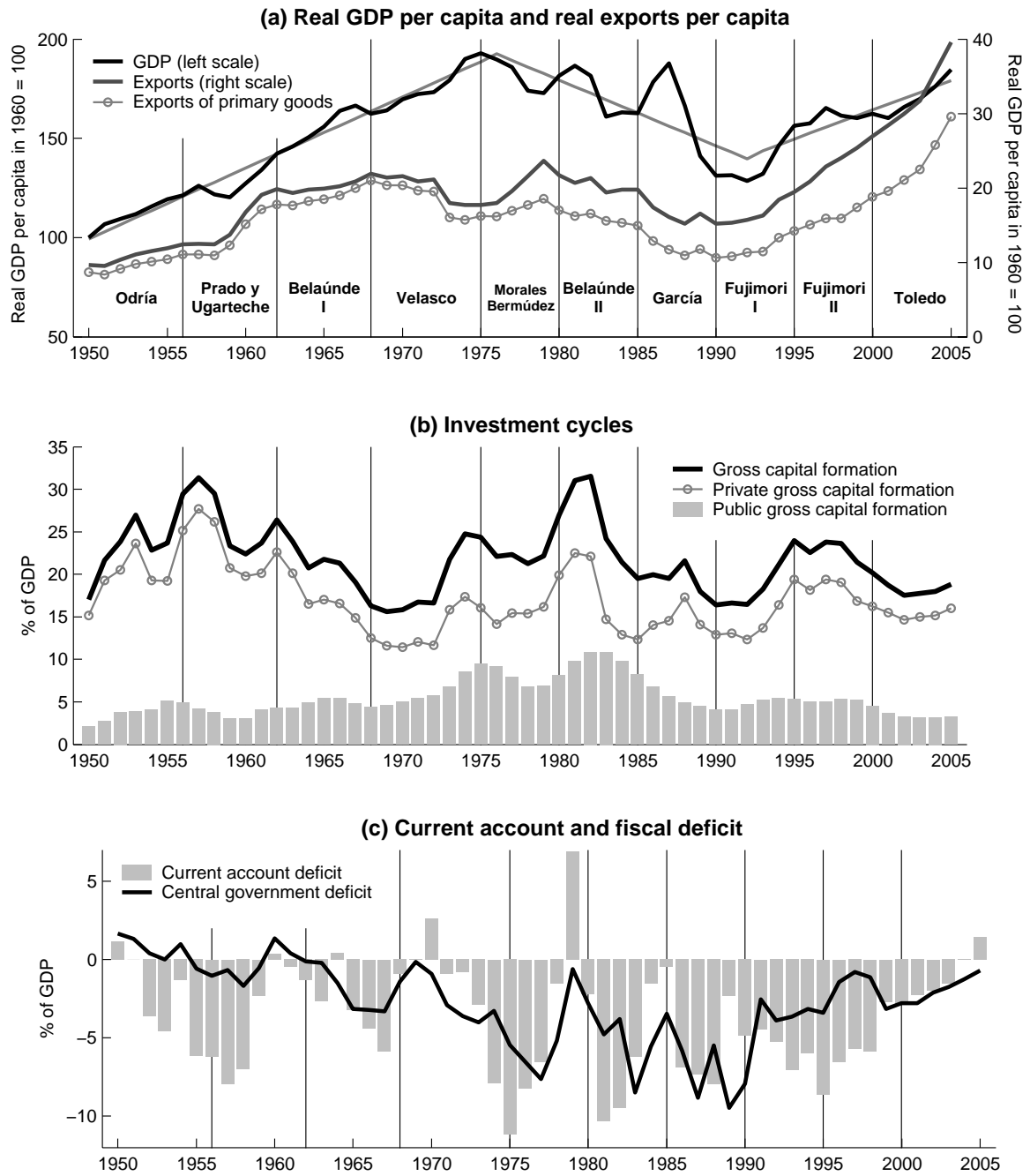


FIGURE 2. Unstable policy and real exchange rate volatility

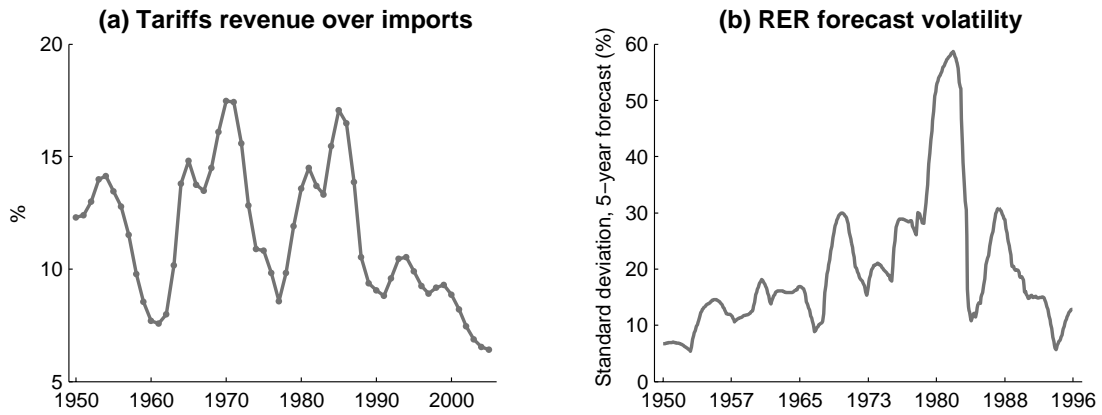
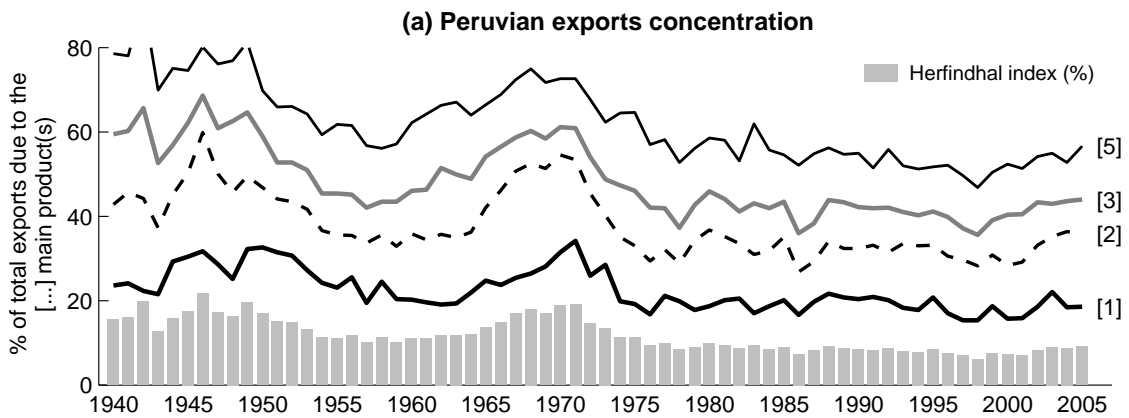


FIGURE 3. Exports concentration



(b) Exports concentration in Latin America (1980 – 2000)

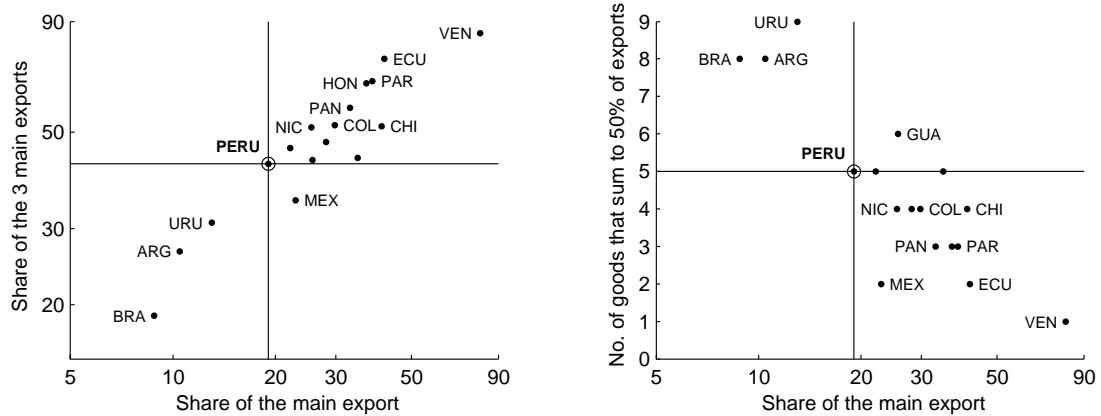


FIGURE 4. Contribution to total exports

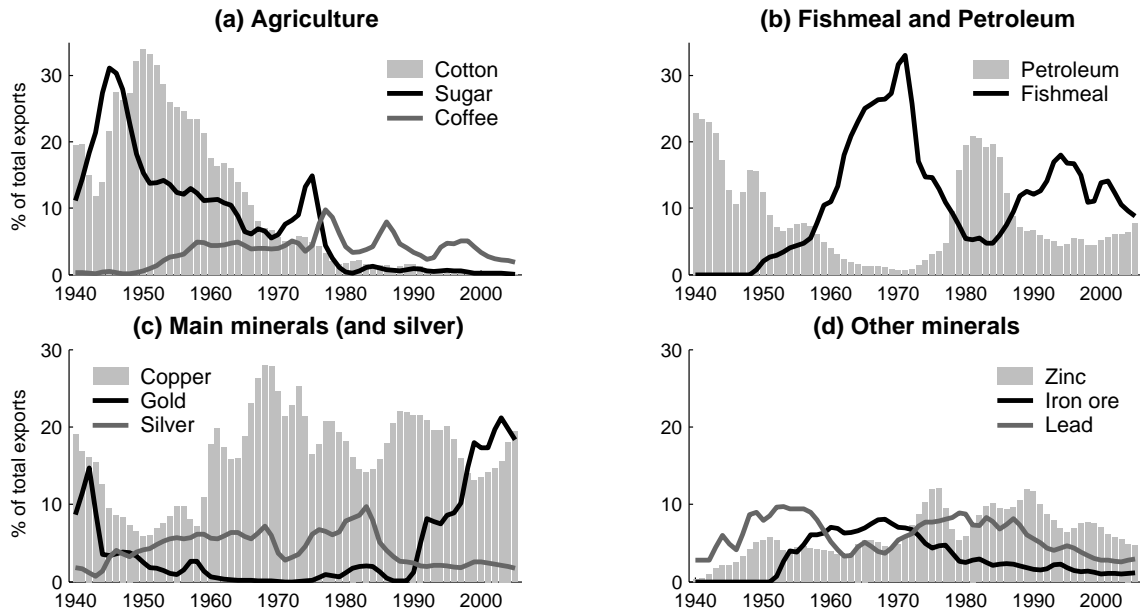


FIGURE 5. Primary exports quantum by sector

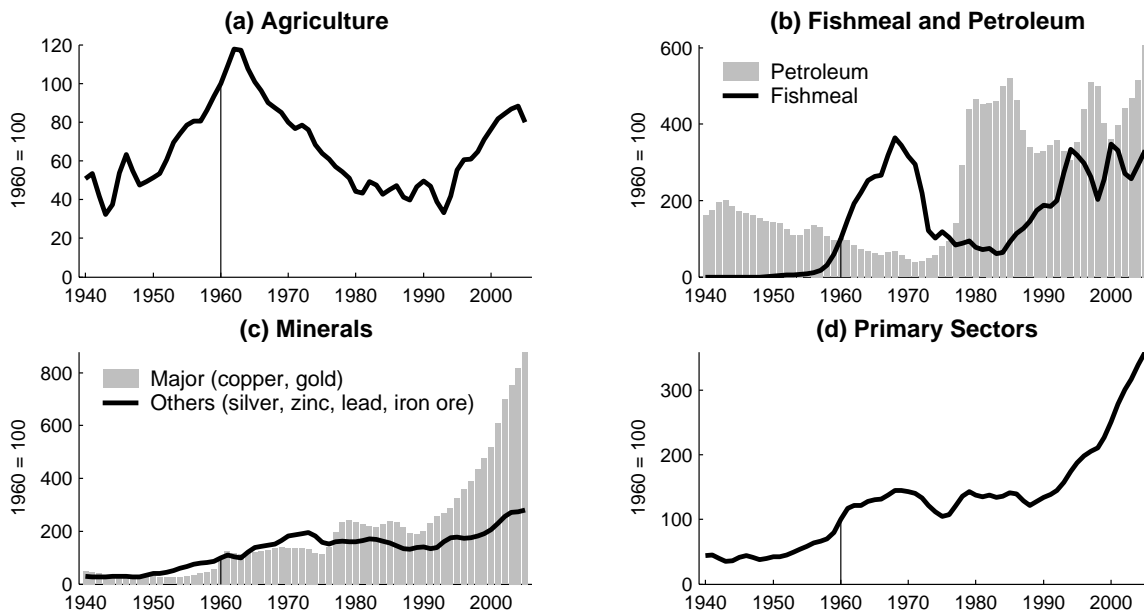
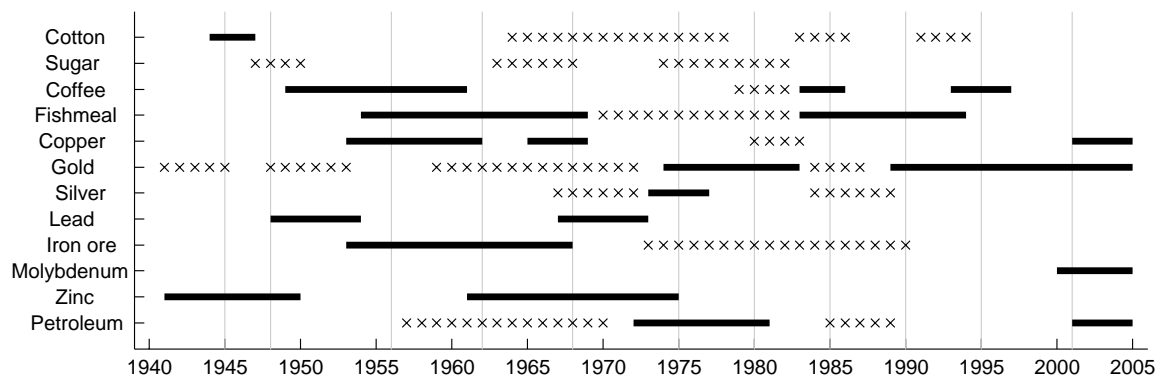


FIGURE 6. *Timing of booms and collapses*



Note: Booms are depicted by solid lines; shrinks by crosses. Based on calculations in Tables 5 and 7.