1. Introduction

This study presents a detailed analysis of the development and performance of the economies of Brazil, Mexico and the USA from 1950 to 1996. Particular attention is paid to the service sectors, for which a longer historical perspective is provided stretching back well into the nineteenth century. It begins with an analysis of the increased orientation of the three economies towards the service sector. This common process hides large differences between the two Latin American countries and the USA in terms of the types of service activities that gained importance, as well as the forces that have made them the dominant sector in all three countries. The study continues with an overview of the measurement of real output in services necessary to compare the performances between the three countries. Most of the remaining part deals with a number of service branches in detail, showing their development and performance over the long run, and the underlying causes of success or failure. The performance in the commodity sectors is also assessed, in particular in manufacturing. The study concludes by confronting the service and commodity sector performances to evaluate the benefits and costs of structural change.

This study was undertaken as part of the research programme of the International Comparison of Output and Productivity (ICOP) project of the University of Groningen. Most ICOP studies focus on agriculture, mining and manufacturing. As the service sector has been the biggest sector in high- and most middle-income economies for several decades, there was clearly an important gap to be filled, even though in this area measurement problems are more severe than in the commodity sectors.

Pilat (1994) was the first ICOP author to include some rough comparisons of output and productivity in services for Korea/USA and Japan/USA. The study is the first to apply the ICOP approach to a large range of service sectors. The methodology for international comparisons in transport and communications and wholesale and retail trade was further developed by van Ark et al. (1999), who compared five member countries of the Organisation for Economic Cooperation and Development (OECD). Van Ark and Monnikhof (2000) extended these comparisons to 24 countries for transport and communications and 19 countries for trade.¹
This study covers the three biggest economies in the Western hemisphere. The USA was selected because it is the world's largest economy, has the highest productivity levels and is the major locus of innovation in services. Brazil and Mexico are the largest countries in Latin America, ranking tenth and twelfth among the world's two hundred or more economies in 1997. As for population, Brazil was the sixth largest country and Mexico the eleventh in that year. The three countries combined represented 25 per cent of world output and 9 per cent of world population in 1997. They are also countries for which there have already been major ICOP studies on relative levels of performance in the commodity sector.2

From 1950 to 1982 Brazil and Mexico experienced rapid growth of gross domestic product (GDP) per capita and a major change in the sectoral composition of their economies. During this period the share of service employment increased from 26 to about 45 per cent, mostly at the expense of agriculture. In the relatively depressed period that followed, service shares grew another 12 points.

To evaluate the performance of these economies, a focus is made on productivity growth, which is the most reliable measure for assessing potential changes in economic welfare. The focus is on labour productivity and leaves aside capital and total factor productivity. Labour productivity is measured by value added per person engaged. The emphasis on this partial indicator was inevitable due to lack of data on capital inputs by sector in Brazil and Mexico, but in most services labour is in any case the main production factor.

International productivity comparisons require a conversion factor to translate value added in different currencies into a common unit. The exchange rate reflects at best the relative price of goods and services entering international trade and is generally a poor proxy for measuring prices of non-tradables. Even for traded goods and services, exchange rates are often not representative of relative values due to exchange controls, international capital flows and trade barriers.

Purchasing power parities (PPPs) are an alternative conversion factor. Expenditure PPPs are based on private consumption, investment and government expenditure. These have been used by several authors to compare output and productivity (Hernandez Laos, 1994; and others, see Maddison and van Ark, 1994 for a longer list).

The first major international comparison of final expenditure was done by Clark (1940), comparing 29 countries. The pioneering study by Gilbert and Kravis (1954) stimulated international comparisons by supplying more sophisticated purchasing power converters. Kravis, Heston and Summers developed the expenditure approach further within the International Comparisons Project (ICP) from the 1960s onwards. Their 1975 edition, in
which they covered 34 countries, was the *magnum opus* of ICP (Kravis *et al.*, 1982). The ICP work was taken up by mainly Eurostat and the OECD who currently compare prices every three years. Other recent ICP comparisons are carried out by economic commissions of the United Nations for Asia, the Middle East and Latin America. The most comprehensive round is 1993 which covers almost one hundred countries.

Expenditure PPPs can be used for total economy comparisons of per capita income and labour productivity (van Ark and McGuickin, 1999). However, their application in the sectoral approach raises several problems. As expenditure values do not only include the production value of the industry in question but also the added values of industries further down the chain, the PPP needs to be adjusted for transport and distribution margins and taxes; see Jorgenson and Kuroda (1990) for Japan *vis-à-vis* USA, and Lee and Tang (1999) for Canada *vis-à-vis* USA. The PPPs also need to be corrected to exclude the relative prices of imported goods and include the prices of exported goods. Hooper (1996) adjusted expenditure PPPs for margins and import and export prices, but he recognises that the latter adjustments require strong assumptions. Finally, expenditure PPPs exclude intermediate sectors like mining, freight transport, trade and business services, which are ‘disguised’ and embodied in final expenditure. Another difference is in the basic source material: ICP uses special surveys whereas ICOP draws on information from production censuses and national accounts permitting cross-checks which are not possible with ICP (van Ark, 1993). Hence the use of these ‘proxy’ PPPs is not unambiguous.

The method preferred here is the industry of origin approach, as pioneered by Rostas (1948) and Paige and Bombach (1959). This approach proposes two ways to compare real production across countries: (a) direct comparisons of real quantities (litres, tons, units), and (b) conversion of industry output in a common currency with a factor that reflects across country differences in producer prices. The two methods yield the same results if all output is covered. In practice, however, the methods provide often different results because of differences in sampling, weighting and coverage of output. With incomplete coverage, method (a) assumes the quantity relative of matched output and method (b) the price relative of matched output representative for the quantity and price relatives of non-matched output, respectively. For four decades most studies used the currency conversion method, as this method allows a larger part of output to be covered than using quantity ratios. Physical quantities are still used for comparisons in agriculture, mining and some service industries such as transport and communications (van Ark and Timmer, 2001).

This study contains a number of novelties. It surveys the literature on the increased service orientation of high- and middle-income economies and the
driving forces. For Brazil, Mexico and the USA a comprehensive overview is given of the developments of major parts of the service sector in the nineteenth and twentieth centuries, as well as the causes of its delayed development in Latin American countries. It reviews previously used measures of output and productivity in services, and presents new yardsticks. Indicators are developed to account for quality differences between countries. Value added in the unregistered sector in the benchmark year is estimated and confronted with official figures. Finally, the comparative results for services are compared with those of the commodity-producing sectors to provide a comprehensive assessment of productivity differences between countries, and to identify areas where catch-up was quickest.

The subsequent chapters are organised as follows. Chapter 2 shows that since 1950 different service activities were responsible for the growing weights of the service sector in the three economies. In Brazil and Mexico distribution, transport and non-market services (education, health care and government services) grew most rapidly compared to business services in the USA. Moreover, different forces shaped the increased service orientation. In Brazil and Mexico the increased demand for education and health care and lagging productivity growth were the main drivers. The latter originated from the rapid pace of urbanisation and the related accumulation of informal labour in service activities such as street-vending and personal services. In the USA the expansion resulted from the rise in the intermediate demand for services as well as the ‘cost disease’, that is the rising relative unit labour costs and lagging productivity growth in services relative to the goods sector.

To assess the productivity performance, the industry of origin approach is used which requires producer prices at the most detailed level possible. In general these prices are obtained implicitly by dividing gross revenues by the quantity of produced services. Quantity information is readily available for most commodity sectors, but for only few service industries. Moreover, in services it is often unclear what exactly is being produced. Chapter 3 reviews for each service category the guidelines of the System of National Accounts 1993, the practices of national accounts in OECD countries, yardsticks proposed by other studies and finally the measures adopted here.

Several service branches are analysed in more detail in Chapters 4 to 8: transport, communications, wholesale and retail trade, banking, insurance and real estate, health care and education. These branches were chosen on the basis of their relative importance in terms of employment and GDP and the availability of data to measure output. The other service industries were regrouped in a residual ‘other services’, and include entertainment and recreation services, other business services, hotels and restaurants, legal services, personal services, repair services, social and miscellaneous services.
The relatively backward position of services in Brazil and Mexico in 1950 is explained by their sluggish development in the preceding century. In the nineteenth century, for example, the USA experienced major improvements in transport, first by extending its road network, followed by the expansion of canals, and, most important, by the construction of a huge network of railways from the 1840s onwards. In Brazil and Mexico, transport conditions did not improve until the arrival of railways in these countries several decades later than in the USA. High transport costs constrained their economic development. Railways introduced enormous savings, ranging from 6 to 39 per cent of GDP. Other service branches also developed slowly in the Latin American countries.

Since 1950 rising per capita incomes, industrialisation and urbanisation has accelerated the development of the service sector in Brazil and Mexico. From 1950 to 1982 Brazil’s labour productivity performance relative to that of the USA somewhat improved in finance, transport and communications, but stagnated in other services. In Mexico, distribution, finance and other services showed some catch-up with US productivity levels in the same period. Since 1982 relative productivity has fallen in almost all service industries in Brazil and Mexico.

Chapters 4 to 8 give a number of reasons which explain the relatively slow catch-up or stagnation of Brazilian and Mexican services in the post-war period. These include excessive regulation in transport and distribution, and the lack of incentives for productivity improvements in health care and education, and in public enterprises in transport and communications. High inflation constrained the development of the financial sector in Mexico, while it had the opposite effect in Brazil. Poverty substantially deprived the productivity performance of the service sector, as most informal and underemployed workers are concentrated in this sector.

To put the performances of the service sectors into perspective, Chapter 9 presents the achievements of the commodity sector in the three countries. For agriculture, mining and manufacturing, relative levels of output and labour productivity are presented for 1975. For manufacturing, benchmark comparisons for 1985 and 1988 are also introduced. In 1975, labour productivities in agriculture, mining and manufacturing were 6, 45 and 46 per cent of the US level. In Mexico, the relative levels in the same branches were 10, 39 and 25 per cent. The extrapolated results for 1950–96 show that the performances of Brazilian and Mexican agriculture stagnated relative to that of the USA. In the Latin American countries mining showed fast catch-up, in particular in the 1970s; this trend was reversed from the mid-1980s onwards. Brazilian manufacturing productivity relative to its US counterpart improved from 1950–77, after which its relative performance fell until the
1990s when it stabilised. In contrast, Mexico’s relative manufacturing performance was stable from 1950–82, after which it fell.

The concluding chapter confronts the productivity performances of the commodity and the service sectors. Until 1982 the two Latin countries showed a modest catch-up with US productivity levels in the service sector, but their relative performance worsened later. In Brazil and Mexico, the relative performance in the service sectors after 1950 was slightly better than that in their secondary sectors, but much better than in their primary sectors. In Brazil, productivity levels in the secondary and tertiary sectors rose approximately 10 percentage points from 1950 to 1982. In Mexico, the comparative performance in both sectors remained stable. From 1982 to 1996 the secondary sectors experienced a larger fall in productivity than services in both countries, despite the faster rate of employment growth in services. Hence the growing weights of the service sector in GDP and in particular employment, and the corresponding drop in the share of agriculture, had a positive impact on Brazil and Mexico’s comparative labour productivity performance.

This overall finding hides large differences in the relative performances between and within service industries. The increased service orientation was accompanied by an increase in relative productivity levels in some parts of services, which increased productivity levels of the economy as a whole. However, the large increase in the service share in employment also reflects the hoarding of informal labour in sectors like retailing and personal services. In general this pool of informal labour contributes little to growth and development as its labour productivity is low due to little schooling and capital.

NOTES

1. For an overview of the ICOP project and its roots, see Maddison and van Ark (1988), van Ark (1993), Maddison and van Ark (1994) and van Ark and Timmer (2001).
3. The cost savings were estimated between 5 and 9 per cent for the USA in 1890 (Fogel, 1964), between 6 and 22 per cent of GDP for Brazil in 1913 (Summerhill, 1997) and between 8 and 39 per cent for Mexico in 1910 (Coatsworth, 1981).