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CENTRE FOR THE STUDY OF LIVING STANDARDS

OVERVIEW OF DEVELOPMENTS IN ICT INVESTMENT IN CANADA, 2010: Rebounding From the Recession

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Overview of Developments in ICT Investment in Canada, 2010: Rebounding From the Recession

Executive Summary

This report is based on an updating of the CSLS ICT database for Canada to 2010. ICT investment is comprised of three key components: computer equipment, communication equipment, and software investment. The database contains data on these variables by industry since 1980. The following summary gives a brief overview of developments in ICT investment since 2000, focusing particularly on 2010.

- ICT investment performance in Canada for 2010 was positive. Following the decline in ICT investment in 2009 due to the recession, ICT investment rebounded back in both nominal and real terms for all three components.

- Total economy ICT investment rose 1.6 per cent in current dollars in 2010, slightly below the average growth rate of 2.1 per cent experienced during the 2000-2009 period, and well below the 5.3 per cent increase in current dollar total economy investment (fixed, non-residential) experienced in 2010. Nominal ICT investment increased 3.3 per cent in computers, rose 4.8 per cent in communications, and fell 0.2 per cent in software.

- Total economy ICT investment rose 8.4 per cent in chained 2002 dollars, above both the average growth rate of 7.0 per cent experienced during the 2000-2009 period and the 6.9 per cent increase experienced by total economy investment (fixed, non-residential) in 2010. Real ICT investment growth was driven by investment in the business sector, which increased 10.5 per cent, while total ICT investment in the non-business sector increased by a meagre 0.5 per cent. In terms of the three ICT components, real ICT investment in 2010 increased 18.3 per cent in computers, 15.4 per cent in communication, and 1.9 per cent in software.

- In 2010, ICT investment prices resumed their downward trend, following an increase in 2009. Prices for all three components of ICT fell in 2010, with prices of total economy ICT investment goods decreasing by 6.3 per cent. Computer ICT prices fell the most steeply (12.6 per cent), followed by communication equipment (9.2 per cent), and finally software (2.1 per cent). This price decrease largely reflected a 10.8 per cent appreciation in the value of the Canadian dollar relative to the US dollar in 2010.

Overview of Developments in ICT Investment in Canada, 2010: Rebounding From the Recession[1]

The aim of this report is to provide an overview of recent developments in ICT investment in Canada. The analysis is based on a 2010 update of the ICT database for Canada developed and maintained by the Centre for the Study of Living Standards (CSLS).[2] This report is divided into three sections, all of which offer a focus on ICT investment by component (computer, communication equipment and software investment). The first section reviews developments in current dollar ICT investment. It looks at ICT investment as a share of GDP, ICT investment in both the business and non-business sector, ICT investment by industry and ICT investment per worker. The second section then reviews developments in ICT prices. Finally, the third section analyzes the major developments in constant dollar (chained 2002 dollars) ICT investment, focusing on the same dimensions examined under nominal ICT investment. The report builds on and extends earlier CSLS work on ICT investment trends (Sharpe, 2005, 2006 and 2010; CSLS, 2008; Sharpe and Arsenault, 2008a and 2008b; Sharpe and de Avillez, 2010).

I. Nominal ICT Investment

In 2010, total economy ICT investment in Canada, expressed in current dollars, increased 1.6 per cent to $39.0 billion. This is slightly below the average annual increase of 2.1 per cent experienced between 2000 and 2009 (Charts 1-2), but still a good performance compared to the 4.3 per cent decline witnessed in 2009. Total economy fixed non-residential investment increased 5.3 per cent to $241.6 billion in 2010, recovering from a 10.5 per cent decline in 2009 (Chart 3). During the 2000-2009 period, nominal total economy investment (fixed, non-residential) grew at an average rate of 4.3 per cent per year, considerably faster than nominal ICT investment growth in the same period.

A. Nominal ICT Investment in Business and Non-business Sectors[3]

The total economy can be divided into the business and the non-business sector. The business sector represents approximately 80 per cent of total economy GDP and includes

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[2] http://www.csls.ca/data/ict.asp The database provides estimates of ICT investment and ICT capital stock in Canada and the United States by industry, broken down into 20 two-digit NAICS sectors, as well as on a per worker basis. Data from CANSIM was retrieved on June 10, 2011. The data are broken down by the three ICT components: computers, communications, and software, and are expressed in both current and 2002 chained dollars. ICT estimates by industry are available for the period 1980 to 2010. Estimates of ICT per worker are only available from 1987 onwards for certain industries due to the more limited availability of employment estimates.

[3] In 2010, Statistics Canada substantially revised the figures for nominal ICT investment in both the business and non-business sectors back to 2000. This revision also affects the figures for real ICT investment in both sectors. The figures for the growth rate of business sector nominal ICT investment in 2009 were revised from 0.6 per cent to -7.2 per cent, and the figures for the growth rate of non-business sector nominal ICT investment in 2009 were revised from -3.6 per cent to 8.9 per cent.

industries whose output is marketed. The non-business sector includes industries and activities whose output is generally not marketed, such as public administration, healthcare and social assistance, and educational services.

The increase of 1.6 per cent in nominal total economy ICT investment in 2010 was driven entirely by the expansion of the business sector, which grew 3.1 per cent to $31.3 billion (Chart 1). ICT investment in the non-business sector did not fare as well, decreasing 4.2 per cent to $7.7 billion. This is an unusually weak performance for the non-business sector, given that during the 2000-2009 period, non-business sector ICT investment experienced an average annual growth rate of 5.0 per cent, even after suffering an 18.6 per cent decline in 2002. For the same period, the business sector ICT investment growth rates were comparatively less impressive, averaging 1.4 per cent a year.

B. Nominal ICT Investment by Component

Total ICT investment consists of three components: computer investment, communication equipment investment, and software investment. Nominal computer investment increased 3.3 per cent to $10.8 billion in 2010, recovering from its large decline of 11.7 per cent in 2009 (Charts 4-5). Communications equipment investment increased 4.8 per cent to $6.5 billion, up from a decline of 2.6 per cent in 2009. Software investment was the only ICT component to experience a decline, falling 0.2 per cent to $21.7 billion, a slight improvement from its 0.7 per cent fall in 2009. These numbers differ from the pattern established during the 2000-2009 period, when nominal investment in communication equipment and computers fell 3.2 and 0.9 per cent per year respectively, while software investment grew at an average rate of 6.6 per cent. In 2010, in other words, investment in communication equipment and computers experienced uncharacteristically high growth, while software investment stagnated, making it the only ICT component to experience essentially no growth following the 2009 recession.

C. Nominal ICT investment by Sector

There was large variation in the growth rates of nominal ICT investment by sector in 2010. ICT investment increased in seven of the fourteen sectors for which total ICT investment data are available (Chart 6). [4]

The sector with the highest growth rate in ICT investment in 2010 was mining, oil and gas extraction, with an increase of 22.4 per cent. This was followed by the manufacturing sector (9.2 per cent) and the wholesale trade sector (6.0 per cent). The health care and social assistance sector exhibited by far the worst performance in ICT investment in 2010, down 12.7 per cent from the previous year. This was followed by the agriculture, forestry, fishing and hunting sector (-5.0 per cent) and the public administration sector (-3.2 per cent).

[4]Data for total ICT investment are not available for the following NAICS sectors: utilities, construction, administrative and support, accommodation and food services, and other services (except public administration). These sectors are thus not included in Chart 6.

D. Nominal ICT Investment as a share of GDP

In 2010, total economy ICT investment in current dollars accounted for 2.56 per cent of nominal GDP (Chart 7), down 0.12 percentage points from 2.67 per cent in 2009, despite rising investment. This decrease happened because nominal GDP increased 6.3 per cent in 2010, while nominal ICT investment increased only 1.6 per cent.

Total nominal ICT investment as a share of GDP was stable at 1.59-1.70 per cent between 1981 and 1985, after which it started growing at a relatively steady pace until 1996, reaching 2.48 per cent of GDP that year. It then gained momentum and started growing at a much higher rate until 1999, when it peaked at 3.20 per cent of GDP. Since then, it dropped back to 2.70 per cent of GDP in 2003 and remained stable in the 2.40-2.80 per cent range ever since. In 2010, total nominal ICT investment as a share of GDP reached its lowest level since 1996.

In 2010, software investment as a proportion of GDP was 1.42 per cent, down from 1.51 per cent of GDP in 2009, a 0.09 percentage point decrease. Communications equipment investment represented 0.42 per cent of GDP in 2010, 0.01 percentage points less than 2009 share of 0.43 per cent of GDP. Finally, computer investment represented 0.71 per cent of GDP in 2010, down 0.02 percentage points from 0.73 per cent of GDP in 2009. Overall, the ICT components remained stable in their shares of GDP in 2010. Note that the 2010 figure for software investment as a proportion of GDP was double that of the computer component and more than three times that of the communications equipment component.

In 2007, the most recent year for which current dollar data for non-business sector and business sector GDP estimates were available, non-business sector ICT investment was 3.16 per cent of GDP and business sector ICT investment was 2.64 per cent of GDP. The non-business sector ICT investment/GDP ratio reached its peak at 3.58 per cent in 1999, whereas business sector ICT investment as a proportion of business GDP peaked at 3.16 per cent in 2000 (Chart 8). ICT investment as a proportion of GDP in the non-business sector has generally been slightly above that of the business sector since the mid-1980s.

E. Nominal ICT Investment per Worker

ICT investment intensity is defined as nominal ICT investment divided by the number of persons employed. Nominal ICT investment increased 1.6 per cent in 2010, and the number of people employed increased by 1.4 per cent the same year (Chart 9). This resulted in a 0.2 per cent increase in nominal ICT investment per worker in 2010 (Chart 10), slightly below the average annual growth rate of 0.6 per cent for the 2000-2009 period. Nominal total ICT investment per worker reached $2,288 in 2010. Nevertheless, this marks an improvement from 2009, where ICT investment intensity fell 2.7 per cent. Overall, annual growth in total ICT investment per worker has been quite volatile since 2000, with negative growth in the first part of the decade, significant increases in mid-decade, and moderate increases in the latter part of the decade.

Computer ICT investment per worker increased 2.0 per cent in 2010, above the average annual decrease of 2.4 per cent observed in the 2000-2009 period. Communication investment per worker increased 3.4 per cent in 2010, which is significantly higher than the average annual decrease of 4.5 per cent for this component over the 2000-2009 period. Finally, software investment per worker decreased 1.5 per cent in 2010, below the average annual increase of 5.1 per cent between 2000 and 2009.

II. ICT Prices

By dividing the current dollar estimates of ICT investment by the 2002 chained dollar figures, it is possible to obtain implicit price indexes for computer, communication equipment, software and total economy ICT investment.[5] Overall, prices for ICT investment goods decreased in 2010. Prices of total economy ICT investment goods decreased by 6.3 per cent (Chart 11), compared to the 2000-2009 period, when ICT prices decreased on average 4.6 per cent per year. This represents a reversal of the events of 2009, which was the first year total economy ICT investment prices increased since the beginning of our series in 1981. The price decreases of 2010 appear to represent a return to the usual trend of falling prices, as total ICT investment prices fell to their lowest level to date. Software investment prices were the only exception, as they fell slightly from the 2009 level but remained the highest they have been since 2005.

In 2010, computer investment prices decreased 12.6 per cent, putting its price level at 34.0 per cent of the price level observed in 2000 (Chart 12). Among the three ICT components, computer investment prices have experienced the largest decrease this decade, dropping on average 10.0 per cent per year throughout the 2000-2009 period. The rate of price decrease, however, decelerated from 2004-2009 (Chart 11).

Communications equipment investment prices decreased 9.2 per cent in 2010, putting its price level at 66.0 per cent of the 2000 price level (Chart 12). The average annual price change from 2000 to 2009 was -3.4 per cent but, again, the rate of price decreases decelerated from 2004 until 2009 (Chart 11).

In 2010, software investment prices decreased 2.1 per cent, and its price level was 88.0 per cent of the 2000 price level (Chart 12). During the 2000-2009 period, software investment prices experienced an average annual decrease of 1.2 per cent per year. Compared to computer and communications equipment investment prices, software investment prices declined at a slower pace from 2003 to 2007, after which prices for this component actually increased for two years in a row (Chart 11).

[5] Price series for the business and the non-business ICT investment (and their components) were also calculated, but since the price movements of the two sectors were relatively similar, they will not be discussed in detail in this report. Business sector ICT investment prices decreased by 6.7 per cent in 2010, while non-business sector ICT investment prices decreased by 4.7 per cent. During the 2000-2009 period, business sector and non-business sector ICT investment prices decreased at an average rate of 4.6 and 4.2 per cent, respectively.

To summarize, prices of all ICT components have declined substantially since 2000, with computer prices falling the most (66.0 per cent), followed by communication equipment (33.7 per cent) and finally software (12.3 per cent). It is important to keep track of price movements when dealing with current dollar figures, because those figures capture both price and volume effects. Thus, although nominal ICT investment for the total economy grew at a rate of 2.0 per cent per year for the 2000-2010 period, since prices were continually dropping real ICT investment grew at an even faster rate.

The decline in the price of ICT investment goods during the 2000-2010 period embodies both the decline in the absolute price of the components and the increase in their quality. Prices are adjusted for changes in the quality of ICT investment goods to reflect the fact that firms can now purchase much more powerful products for lower levels of investment. Hence, increases in the level of real ICT investment can be the result of (i) an increase in the quantity produced/purchased, (ii) an increase in the quality of the ICT investment goods or (iii) an increase in both quantity and quality. In general, an increase in real ICT investment is the result of both an increase in the quantity purchased and an increase in the quality of goods purchased.

Since 2003, there has been a clear negative correlation between total ICT prices and the Canada-US exchange rate (Chart 13). Because ICT investment goods in Canada are largely imported, an increase in the value of the Canadian dollar effectively decreases ICT prices. This trend is evident starting in 2003, when a 12.1 per cent increase in the value of the Canadian dollar in 2003 lead to a large 9.2 per cent fell in ICT prices. The progressively smaller appreciations for 2004 to 2008 lead to progressively smaller declines in ICT prices. When the exchange rate depreciated in 2009, total ICT prices rose significantly. In 2010, the situation reversed itself as total ICT prices fell 6.3 per cent, reflecting a 10.8 per cent appreciation of the Canadian dollar.

III. Real ICT Investment

This section examines trends in real ICT investment by looking at data measured in 2002 chained dollars. Total economy real ICT investment rose 8.4 per cent to $59.2 billion in 2010 (Chart 14-15), above the average rate of increase of 7.0 per cent per year in the 2000-2009 period. In 2010, ICT investment grew faster in real terms than it did in nominal (8.4 per cent versus 1.6 per cent) (Chart 16). Real ICT investment also outperformed total economy investment (fixed, non-residential), which grew 7.0 per cent in 2010 (Chart 17). The improvement in real ICT investment is explained by the 6.3 per cent decrease in ICT prices as well as the 1.6 per cent increase in nominal ICT investment in 2010.

A. Real ICT Investment in the Business and Non-Business Sectors

The increase of 8.4 per cent in total economy ICT investment in 2010 was driven primarily by expansion in the business sector, which grew 10.5 per cent to $48.4 billion, while the non-business sector was relatively stagnant with a 0.5 per cent growth rate (Chart 14), putting it at a value of $10.8 billion. Despite much higher business sector growth in 2010 relative to the non-

business sector, non-business sector ICT investment experienced a higher average annual growth rate during the 2000-2009 period (9.6 per cent versus 6.4 per cent in the business sector). Furthermore, the 10.5 per cent increase in the business sector in 2010 followed a 10.5 per cent decline in 2009, while the low growth in the non-business sector followed a 5.1 per cent increase in 2009.

There appears to be some correlation between the growth of real business sector ICT investment and the growth of labour productivity in the Canadian business sector (Chart 18). From 2001 to 2006, when real business sector ICT investment grew an average of 9.5 per cent per year, labour productivity growth averaged 1.0 per cent per cent per year. From 2007 to 2010, however, when the growth of real business sector ICT investment slowed to 3.4 per cent per year, growth in labour productivity also declined to an average of 0.3 per cent per year. The worst years for labour productivity growth in the business sector, 2008 and 2009, were also the worst years for real ICT investment in the business sector since 2003. Of course, it is difficult to ascertain the direct effect of ICT investment on productivity, given the impact of the business cycle on both investment and productivity.

B. Real ICT Investment by Component

In 2010, real investment in computers increased 18.3 per cent to $25.6 billion, even higher than its average annual growth rate of 10.0 per cent for the 2000-2009 period (Charts 19-20). This jump owes both to a large decrease in computer prices (-12.6 per cent versus 2.9 per cent in 2009), and to the increase in nominal investment (3.3 per cent versus -11.7 per cent in 2009).

Real investment in communication equipment increased 15.4 per cent to $10.1 billion in 2010, well above the average annual growth rate of 0.3 per cent per year experienced over the 2000-2009 period. This increase of 15.1 points between 2010 and 2000-2009 was both due to the large fall in communication investment prices (-9.2 per cent versus 5.1 per cent) and a similarly large increase in nominal communications investment (4.8 per cent versus -2.6 per cent).

Real investment in software increased 1.9 per cent to $24.6 billion in 2010, compared to an average annual growth rate of 7.9 per cent for the 2000-2009 period. This below-average growth was due to a fall in nominal investment, as nominal investment fell 0.2 per cent, much lower than the average annual increase of 6.6 per cent seen in the 2000-2009 period.

C. Real ICT Investment as a Share of GDP

In 2010, real ICT investment expressed as a proportion of GDP rose 0.22 percentage points to 4.80 per cent (Chart 21). Real ICT investment as a share of GDP was relatively steady at 0.26-0.40 per cent between 1981 and 1985. However, it grew steadily from 1986 until 2010, increasing every year (with the exception of 2002 and 2009), and peaking at 4.83 per cent in 2008. The growth in the real share of ICT investment reflects the impact of continually falling ICT prices.

By examining trends in real investment for computers, communications equipment and software as a proportion of total GDP, we can see that overall levels of investment as a proportion of GDP have increased significantly over the years for all components. The rise of real investment in computers as a proportion of GDP is the most dramatic, followed by software investment and finally communications equipment investment. The fact that computer ICT investment accounts for the largest proportion of GDP is unsurprising, given that it also experienced the largest fall in prices. Real investment in computers as a proportion of GDP increased over the 1981-2010 period from 0.01 per cent in 1987 to 2.07 per cent in 2010. The proportion of real investment in software as a share of GDP has also increased, from 0.13 in 1981 to 1.99 per cent in 2010. Finally, real investment in communication equipment as a proportion of GDP increased from 0.45 per cent in 1981 to 0.82 per cent in 2010 (Chart 21).

Business sector ICT investment as a proportion of business sector GDP was 4.73 per cent in 2010 (up 6.7 per cent or 0.3 percentage points from 2009), whereas non-business sector ICT investment represented 5.14 per cent of non-business sector GDP the same year (down 1.7 per cent or 0.09 percentage points from 2009) (Chart 22). In the business sector, investment as a share of GDP followed a similar course to that of the total economy. The share has grown steadily since 1981, with the exception of very slight declines in 2002 and 2009 (0.07 and 0.35 percentage points, respectively). In the non-business sector, growth of real ICT investment as a share of GDP has been positive for every year but three (2002, 2008 and 2010). From 2003 to 2010, the share in the non-business sector has been consistently higher than that of the business sector.

D. Real ICT Investment per Worker

Total economy real ICT investment per worker increased by 6.9 per cent in 2010 (Chart 23), with increases in the investment intensity of all ICT components (16.7 per cent for computers, 13.8 per cent for communication equipment and 0.6 per cent for software). Despite the negative growth in 2009, total economy real ICT investment per worker grew a cumulative 72.1 per cent since 2000, equivalent to an average annual growth rate of 5.4 per cent per year for the 2000-2009 period.

There is some correlation between the growth of real business sector ICT investment intensity and labour productivity in the business sector. From 2003 to 2007, when the growth of real business sector ICT investment intensity averaged 11.0 per cent per year, labour productivity grew an average of 0.9 per cent per year (Chart 24). When real business sector ICT investment intensity declined to an average of 1.6 per cent per year from 2008 to 2010, the growth of labour productivity in the business sector also slowed to 0.3 per cent per year. The worst years for labour productivity growth in the business sector, 2008 and 2009, were also the worst years for growth in real ICT investment intensity in the business sector since 2002. As in the case of real business sector ICT investment, it is difficult to determine the direct impact of ICT investment intensity on labour productivity, given effects of the business cycle on both factors.

It is interesting to note, once again, that ICT investment intensity trends in chained dollars and in current dollars do not necessarily correspond. Total ICT investment per worker in current dollars increased only 6.0 per cent cumulatively during the 2000-2010 period, an average annual increase of 0.6 per cent. Furthermore, during this same period, nominal investment per worker by component fell for computers and communication equipment and increased for software. In contrast, all three real ICT investment components experienced strong growth during this period. As discussed earlier, higher real growth rates relative to nominal growth rates reflect the fact that prices fell over the period.

IV. Conclusion

ICT investment has made a strong comeback in Canada following the decline in investment seen during the 2009 recession. Nominal ICT investment performance in Canada for 2010 was positive, with total economy ICT investment increasing 1.6 per cent in current dollars to $38.9 billion, slightly below the average growth rate of 2.1 per cent experienced during the 2000-2009 period. Total economy real ICT investment fared very well in 2010, increasing 8.4 per cent to $59.2 billion due to a combination of falling price levels and increasing nominal investment. The recovery of real ICT investment following its 7.7 per cent decline in 2009 will have a positive impact on overall labour productivity. This is already evident in the business sector, which experienced a 1.6 per cent growth in labour productivity in 2010 alongside its 10.5 per cent increase in real ICT investment and 9.7 per cent growth in real ICT investment intensity.

Total economy ICT investment prices fell by 6.3 per cent in 2010, returning to the trend of declining prices that was interrupted during the recession in 2009. This price decrease owes partly to the 10.8 per cent appreciation of the Canadian dollar relative the US dollar in 2010, given that Canada imports a significant amount of its ICT capital.

The increase in nominal ICT investment in 2010 was due entirely to the business sector. Non-business sector ICT investment decreased 4.2 per cent, while business sector ICT investment improved 3.1 per cent. In real terms, ICT investment in the business sector and the non-business sector increased by 10.5 and 0.5 per cent, respectively.

In spite of a strong showing for overall ICT investment performance following the recession, software ICT investment remains stagnant. Software was the only component to experience negative nominal investment growth (0.2 per cent) in 2010, despite the fact that it experienced the highest average annual growth rate of nominal investment over the 2000-2009 period. Following the price increases of 2009, software prices remain at their highest level since 2005.

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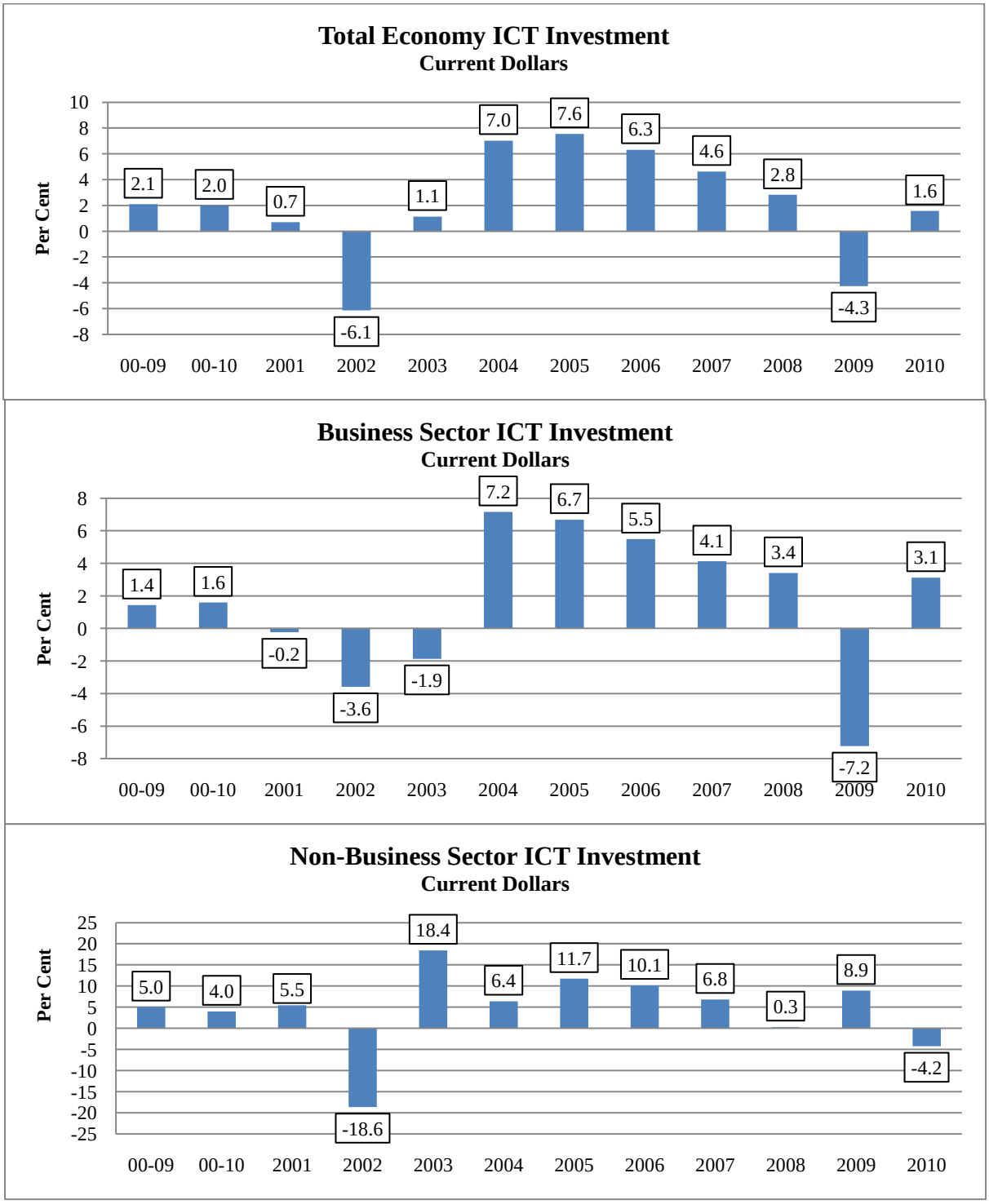
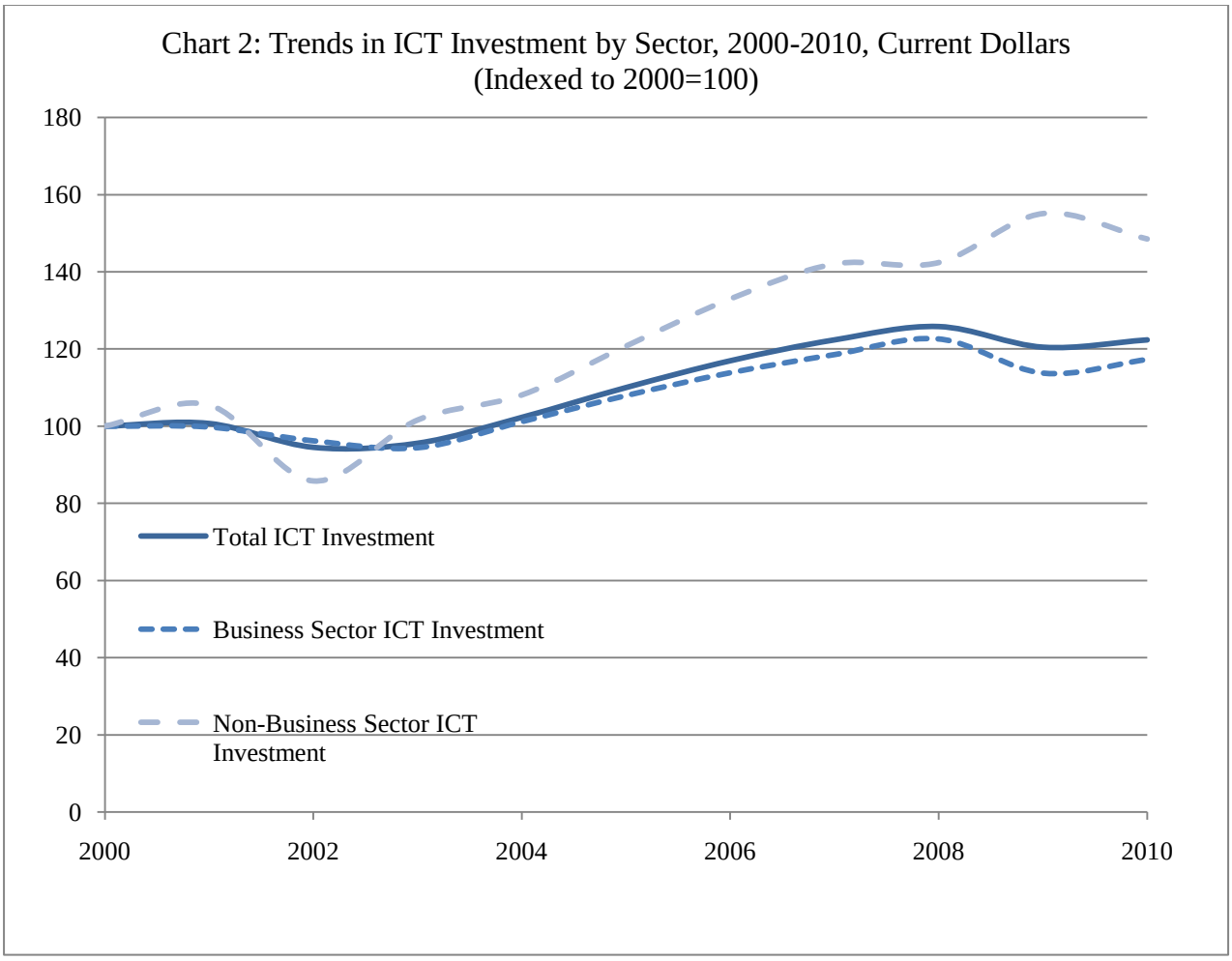
Charts

Chart 1: Trends in ICT Investment by Sector, 2000-2010, Current Dollars
(Average Annual and Annual Growth Rates, per cent)

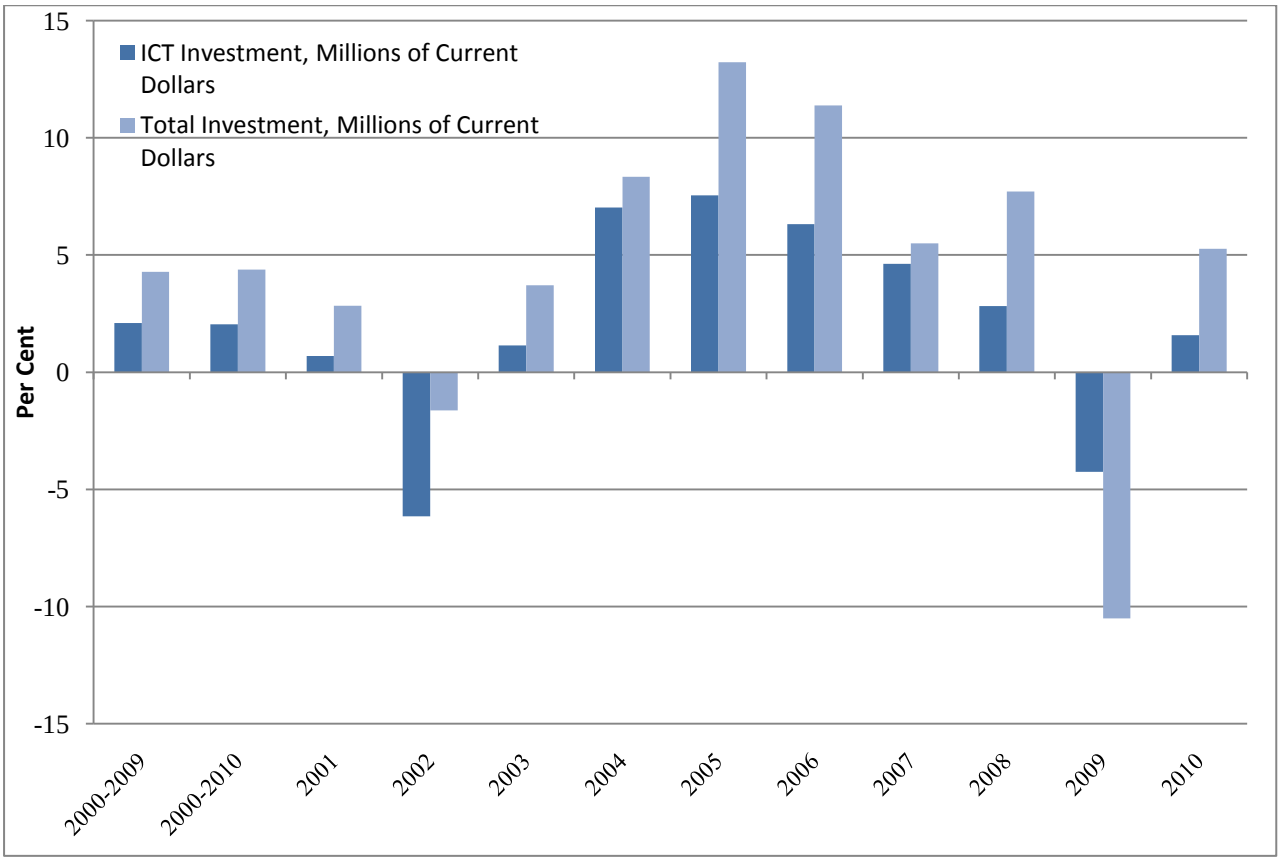


Source: CSLS ICT Database, which was built using Statistics Canada estimates.



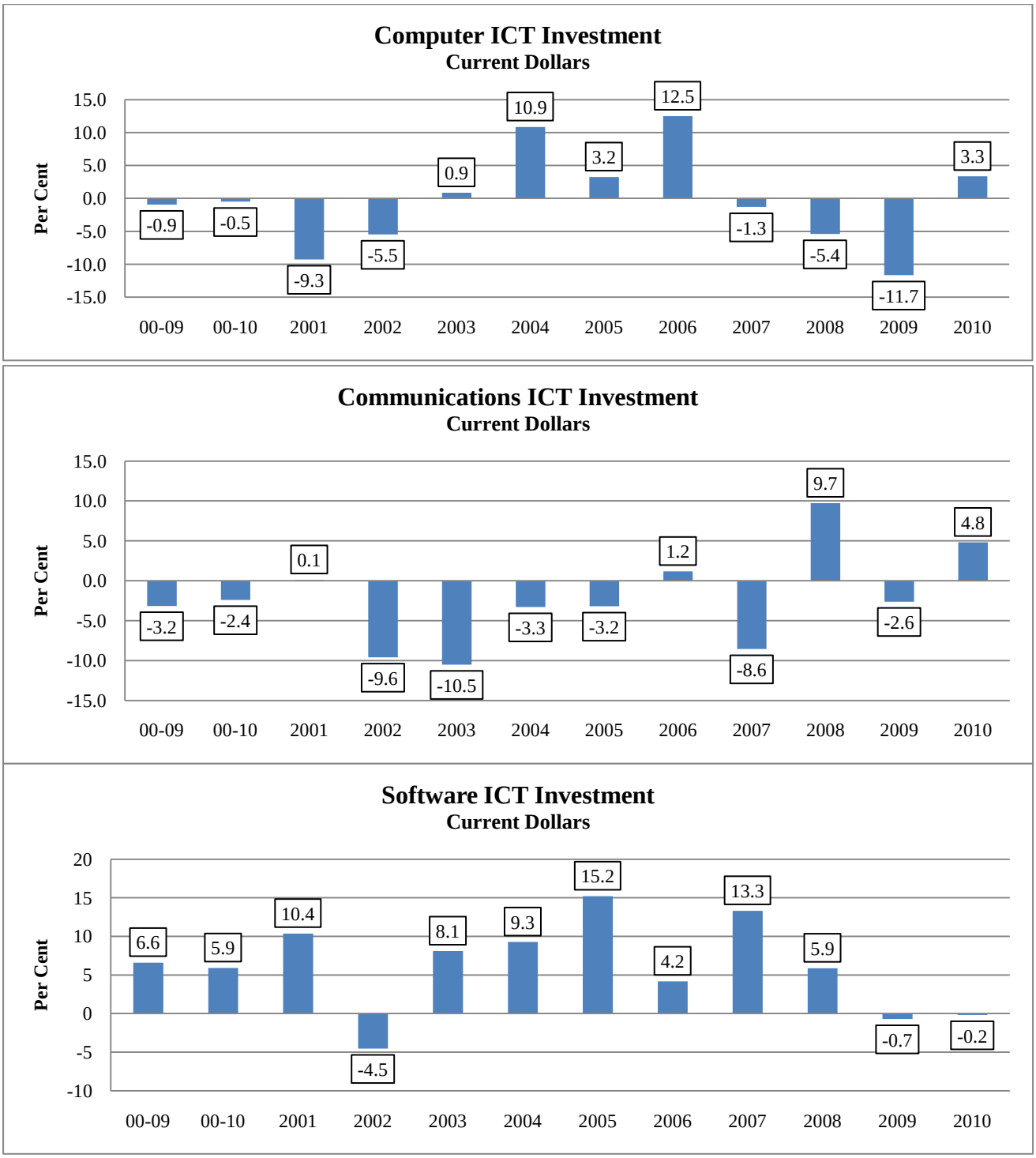
Source: CSLS ICT Database, which was built using Statistics Canada estimates.

Chart 3: Total Economy ICT Investment and Total Economy Investment (Fixed, Non Residential), 2000-2010, Current Dollars
(Average Annual and Annual Growth Rates, per cent)

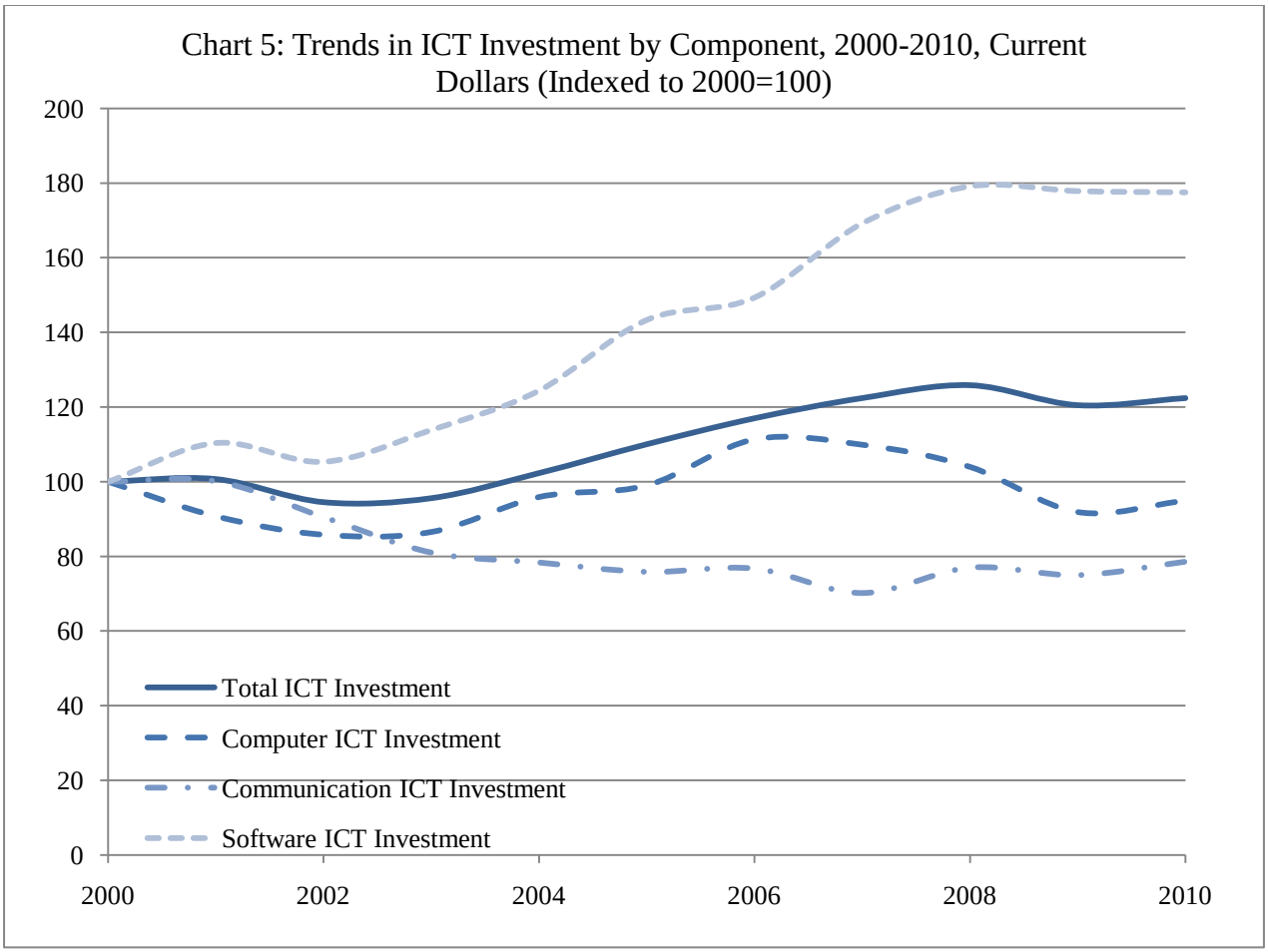


Source: CSLS ICT Database, which was built using Statistics Canada estimates.

Chart 4: Trends in ICT Investment by Component, 2000-2010,
Current Dollars
(Average Annual and Annual Growth Rates, per cent)

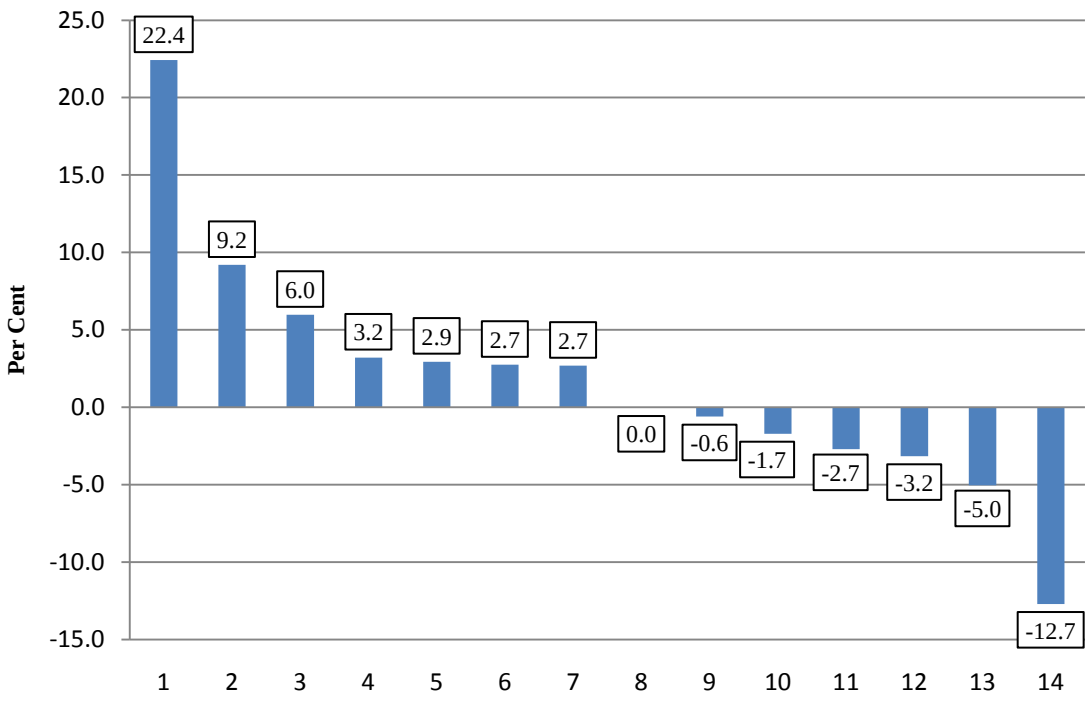


Source: CSLS ICT Database, which was built using Statistics Canada estimates.



Source: CSLS ICT Database, which was built using Statistics Canada estimates.

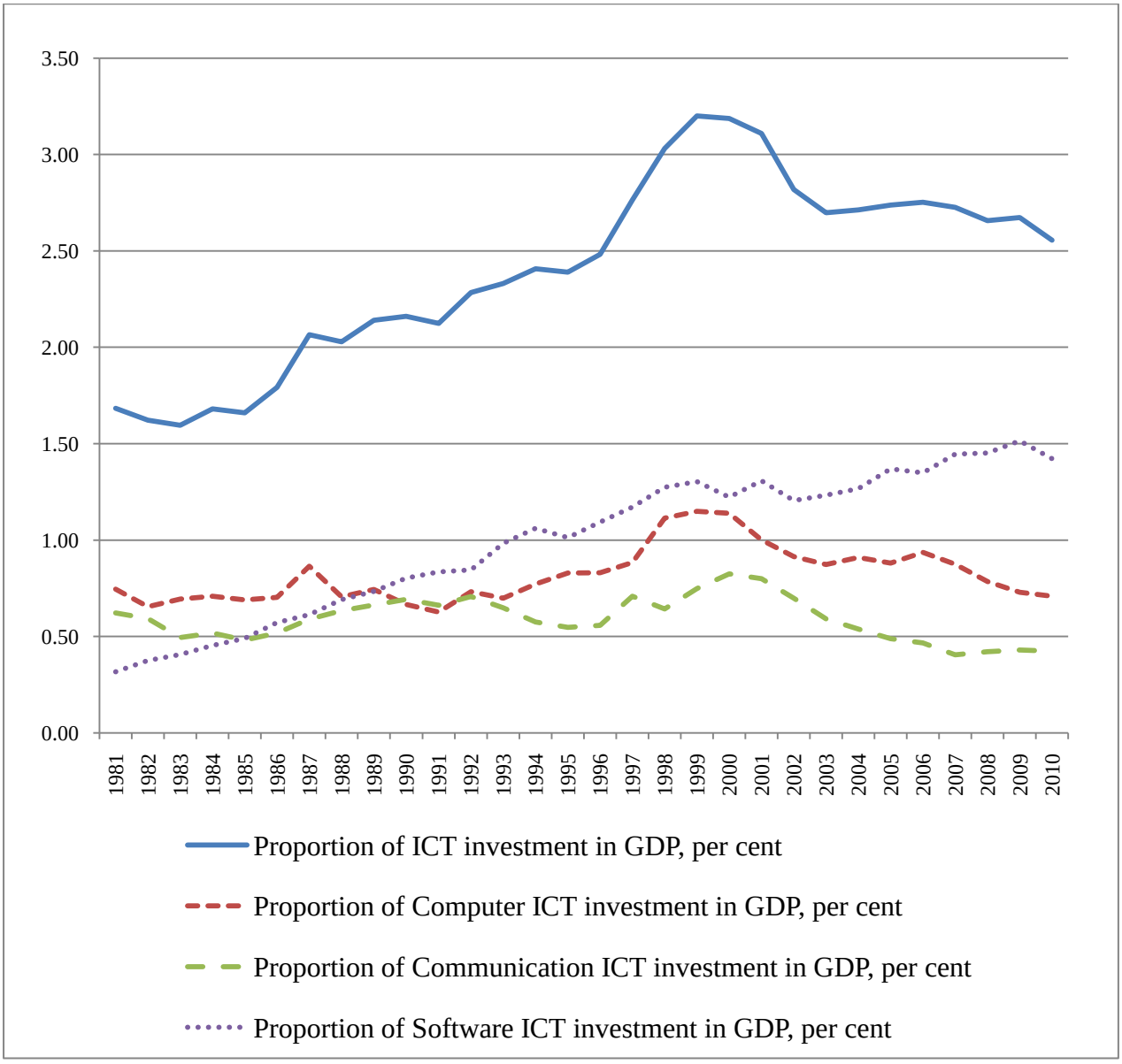
Chart 6: ICT Investment by Industry, 2010, Per Cent Change
Current Dollars



1. Mining and oil and gas extraction
2. Manufacturing
3. Wholesale trade
4. Retail trade
5. Real estate and rental and leasing
6. Information and cultural industries
7. Arts, entertainment and recreation
8. Professional, scientific and technical services
9. Management of companies and enterprises
10. Finance and insurance
11. Educational services
12. Public administration
13. Agriculture, forestry, fishing and hunting
14. Health care and social assistance

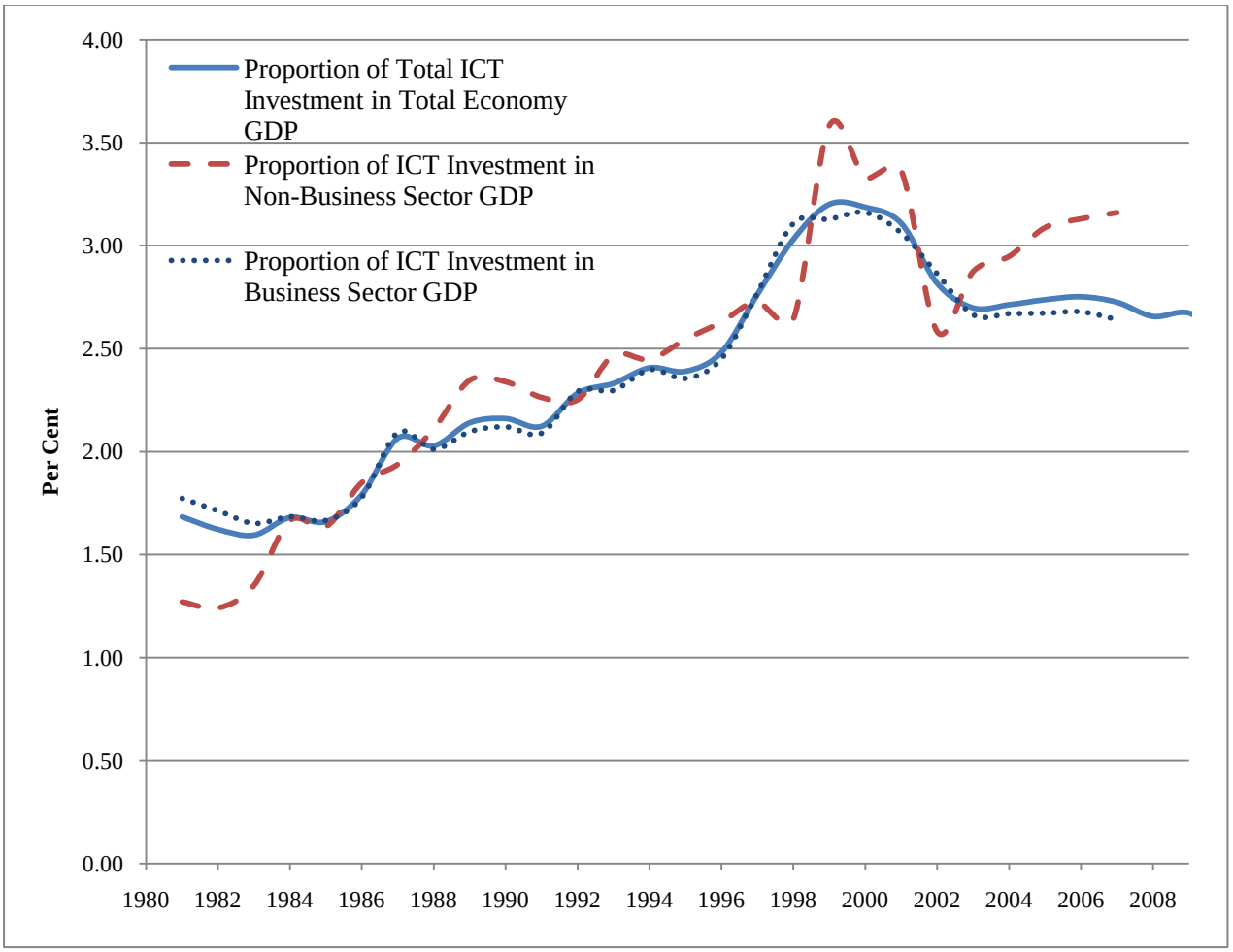
Source: CSLS ICT Database, which was built using Statistics Canada estimates.

Chart 7: Trends in ICT Investment by Component as a Proportion of GDP, 1981-2010, Per Cent, Current Dollars



Source: CSLS ICT Database, which was built using Statistics Canada estimates.

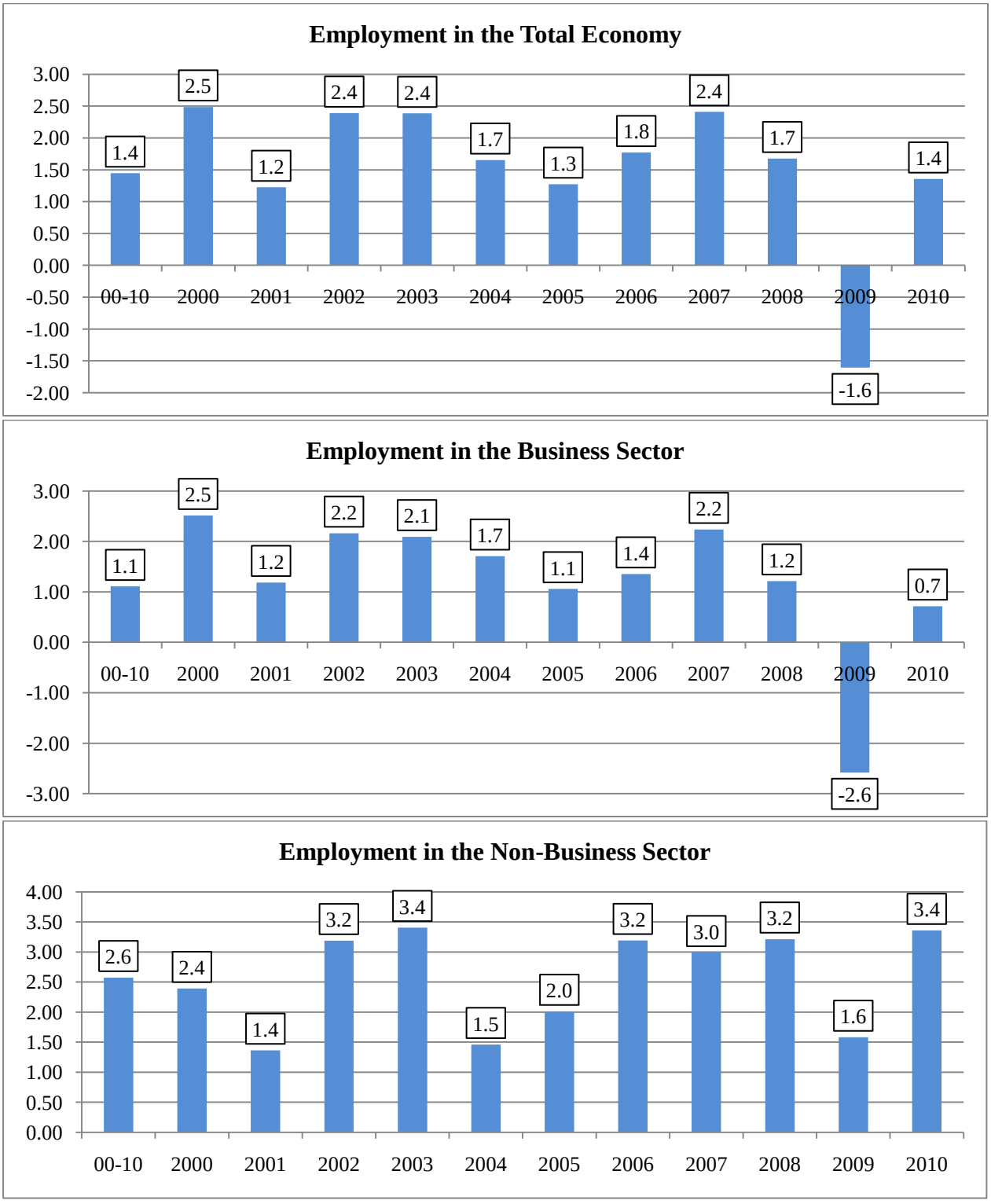
Chart 8: ICT Investment as a Proportion of GDP by Total Economy, Business Sector and Non-Business Sector, 1981-2010, Current Dollars



Note: GDP data expressed in current dollars for 2008, and 2010 for the business and non-business sectors are not available.

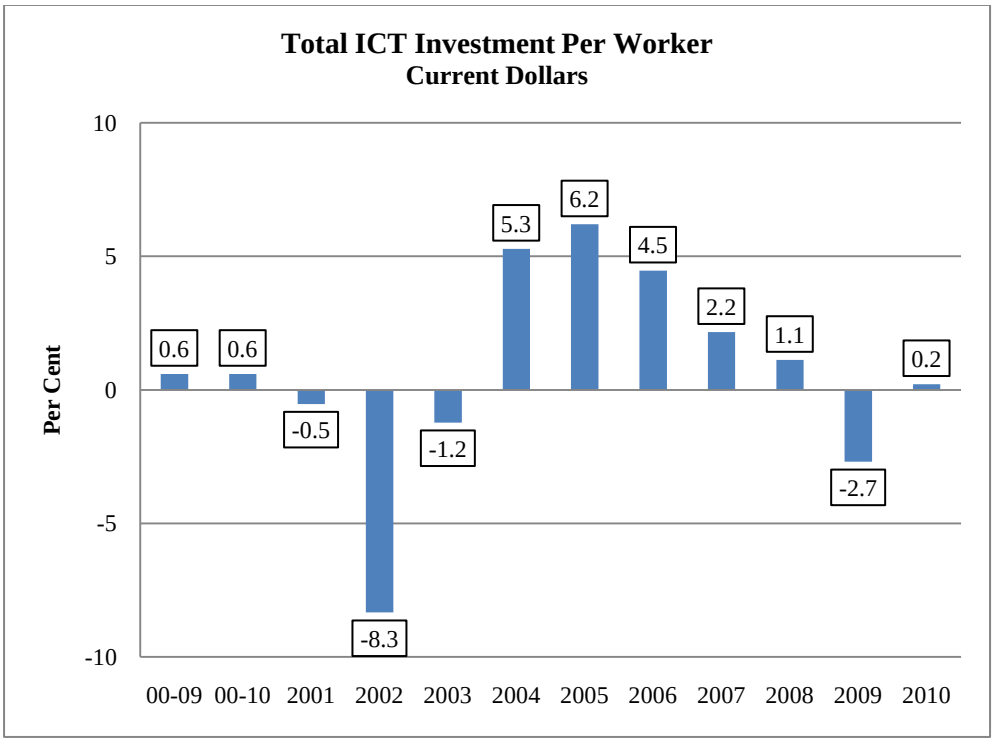
Source: CSLS ICT Database, which was built using Statistics Canada estimates.

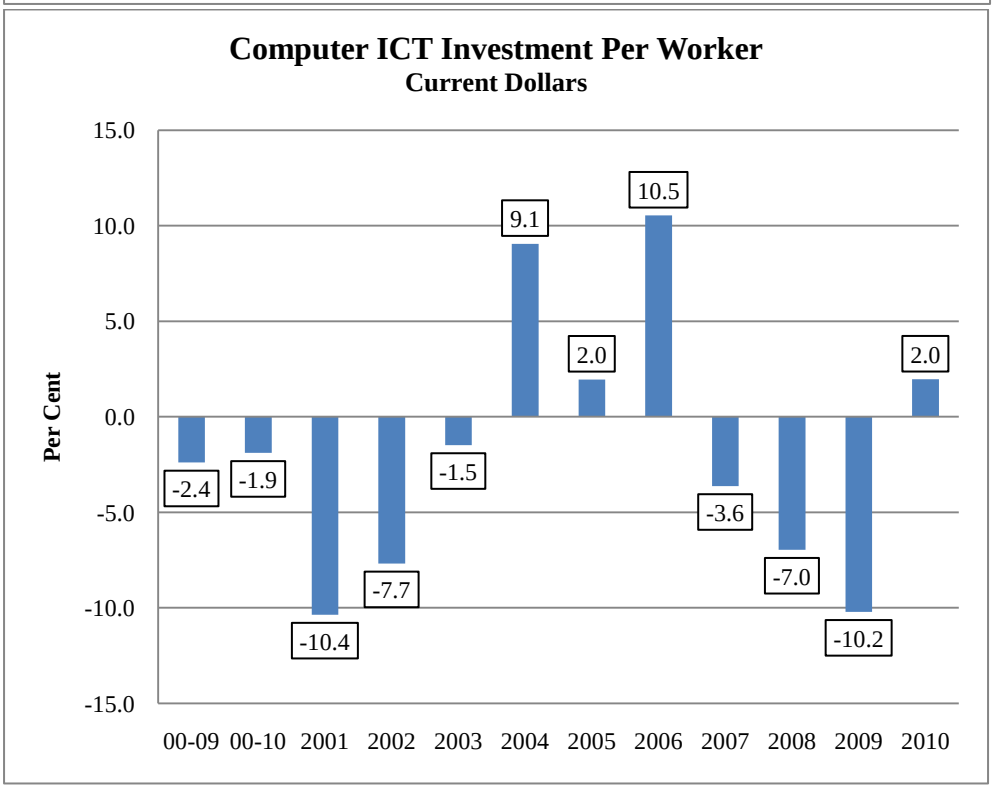
Chart 9: Number of Workers in the Total Economy, Business Sector, and Non-Business Sector, 2000-2010 (Annual Growth Rates, per cent)

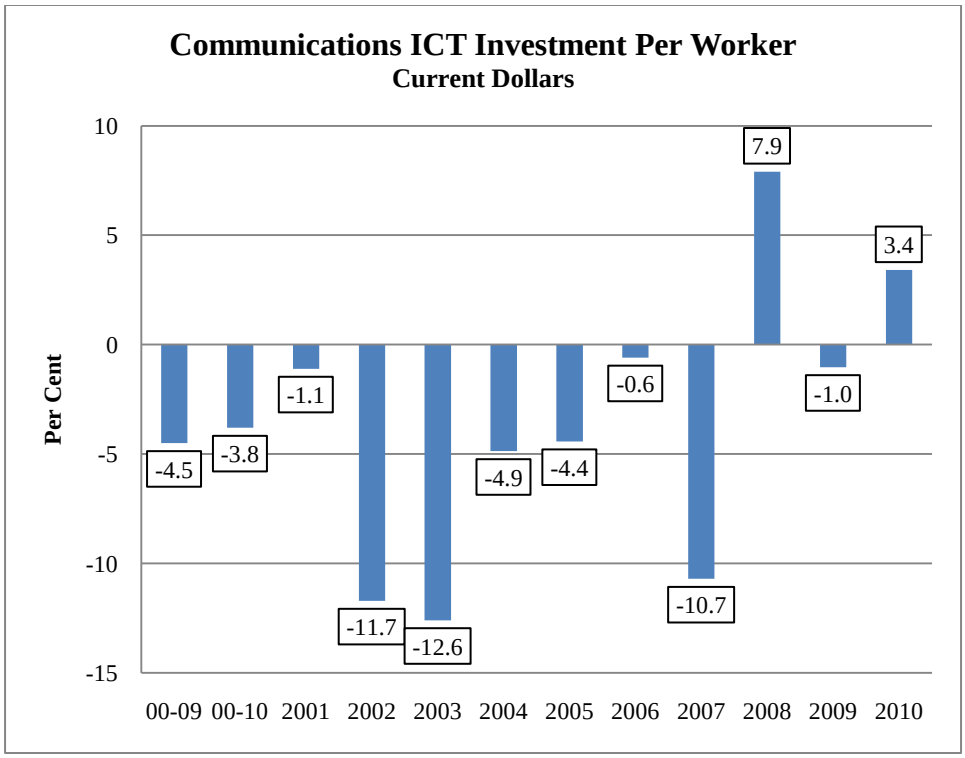


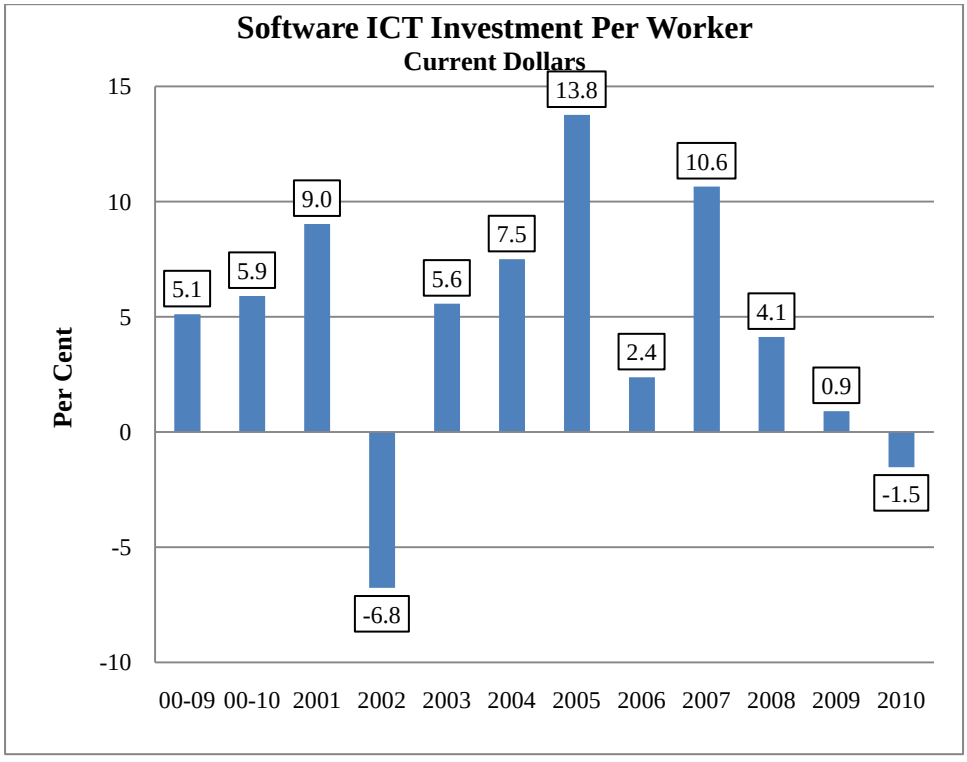
Source: CSLS ICT Database, which was built using Statistics Canada estimates.

Chart 10: Trends in ICT Investment per Worker by Component, 2000-2010, Current Dollars
(Average Annual and Annual Growth Rates, per cent)



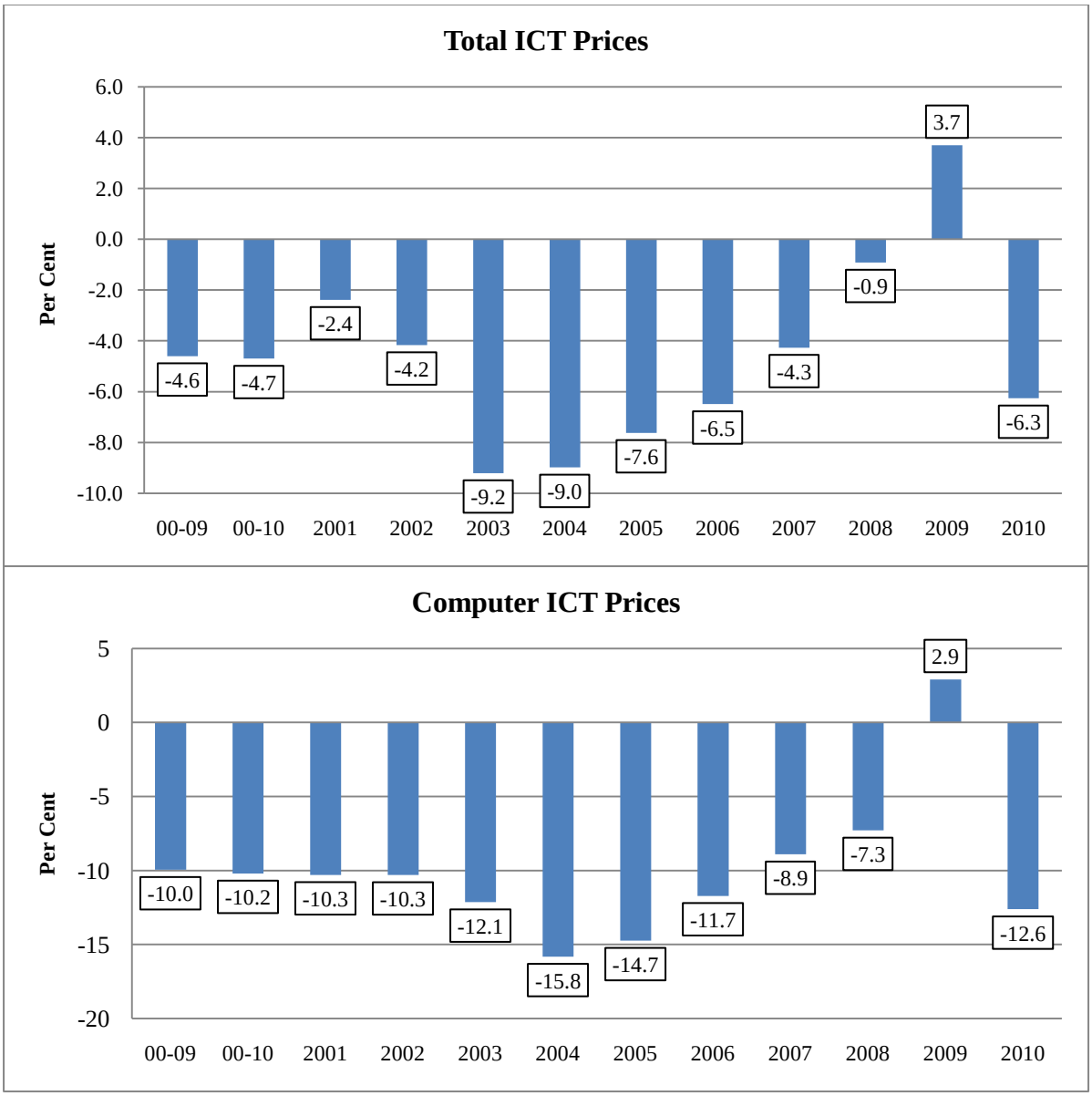


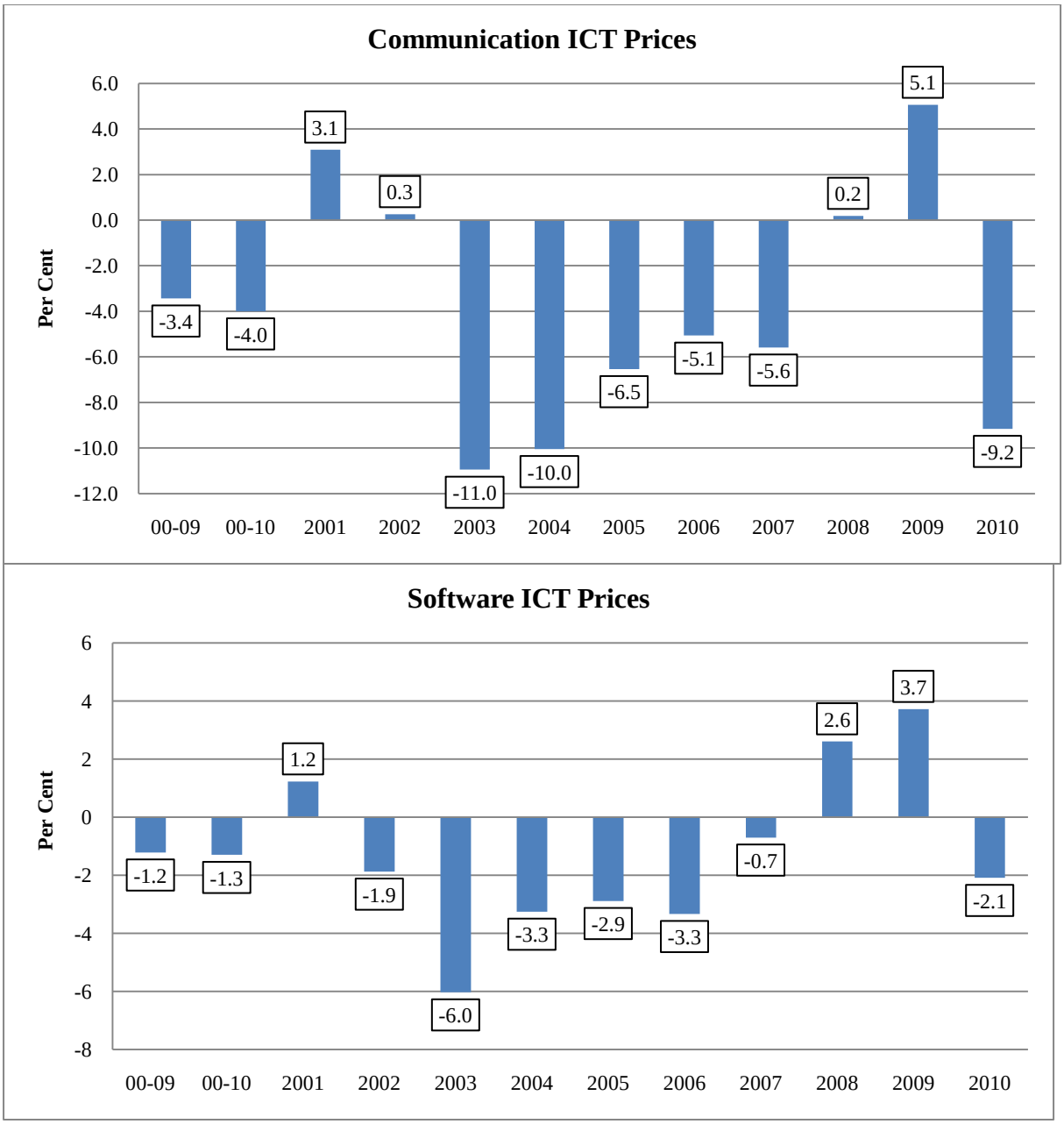




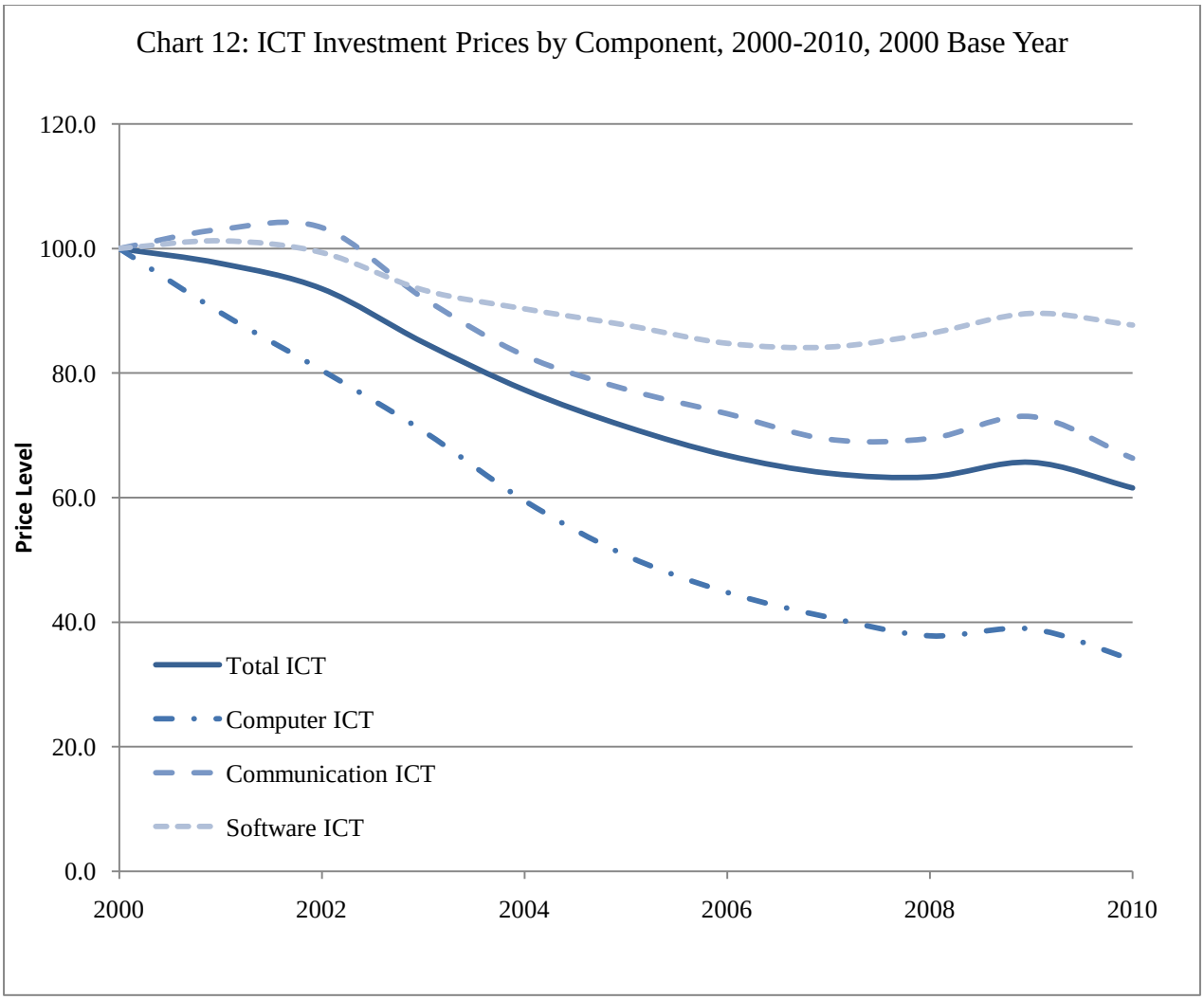
Source: CSLS ICT Database, which was built using Statistics Canada estimates.

Chart 11: Trend in Price of ICT Goods by Component, 2000-2010, 2002 base year
(Average Annual and Annual Growth Rates, per cent)



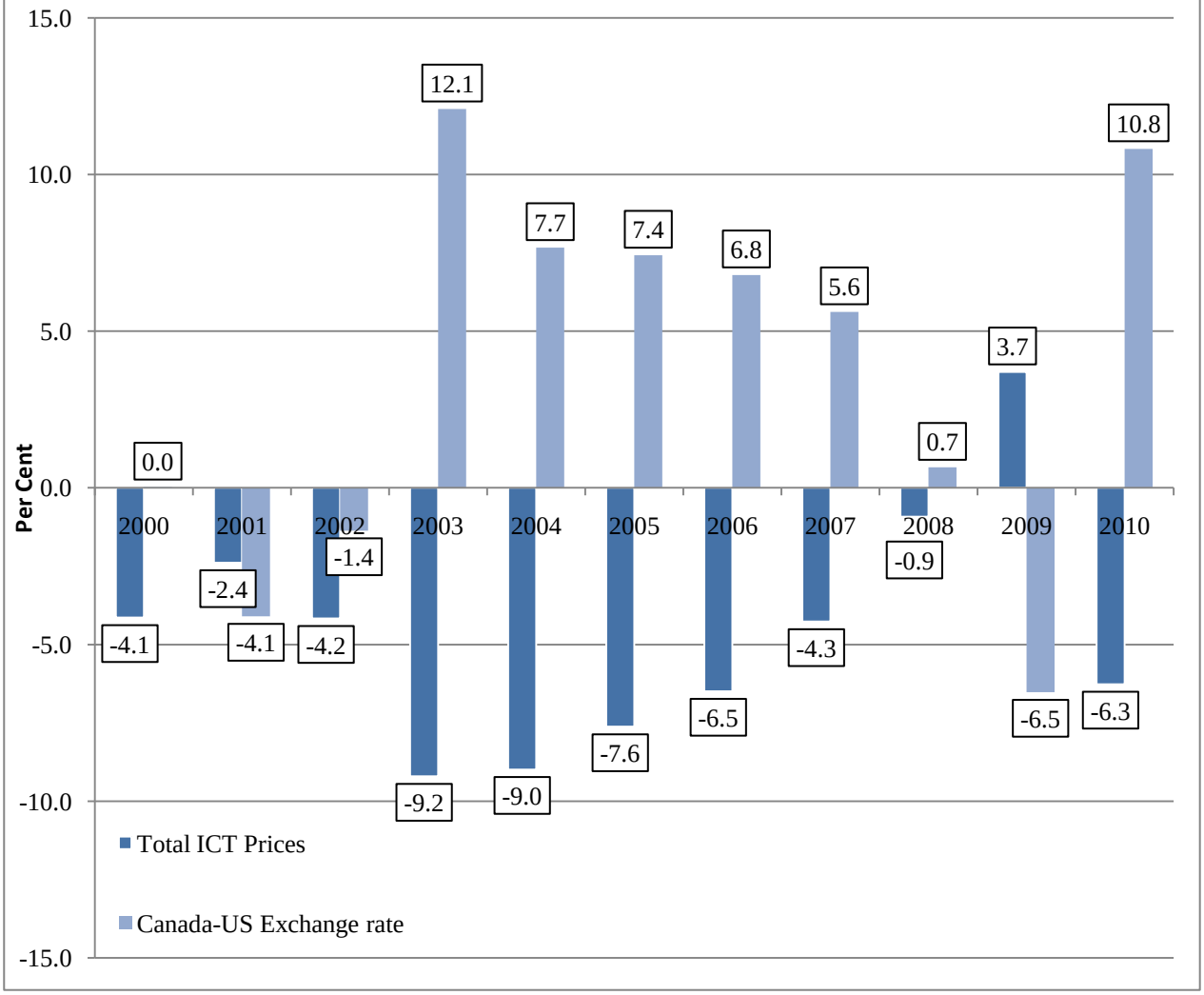


Source: CSLS ICT Database, which was built using Statistics Canada estimates.



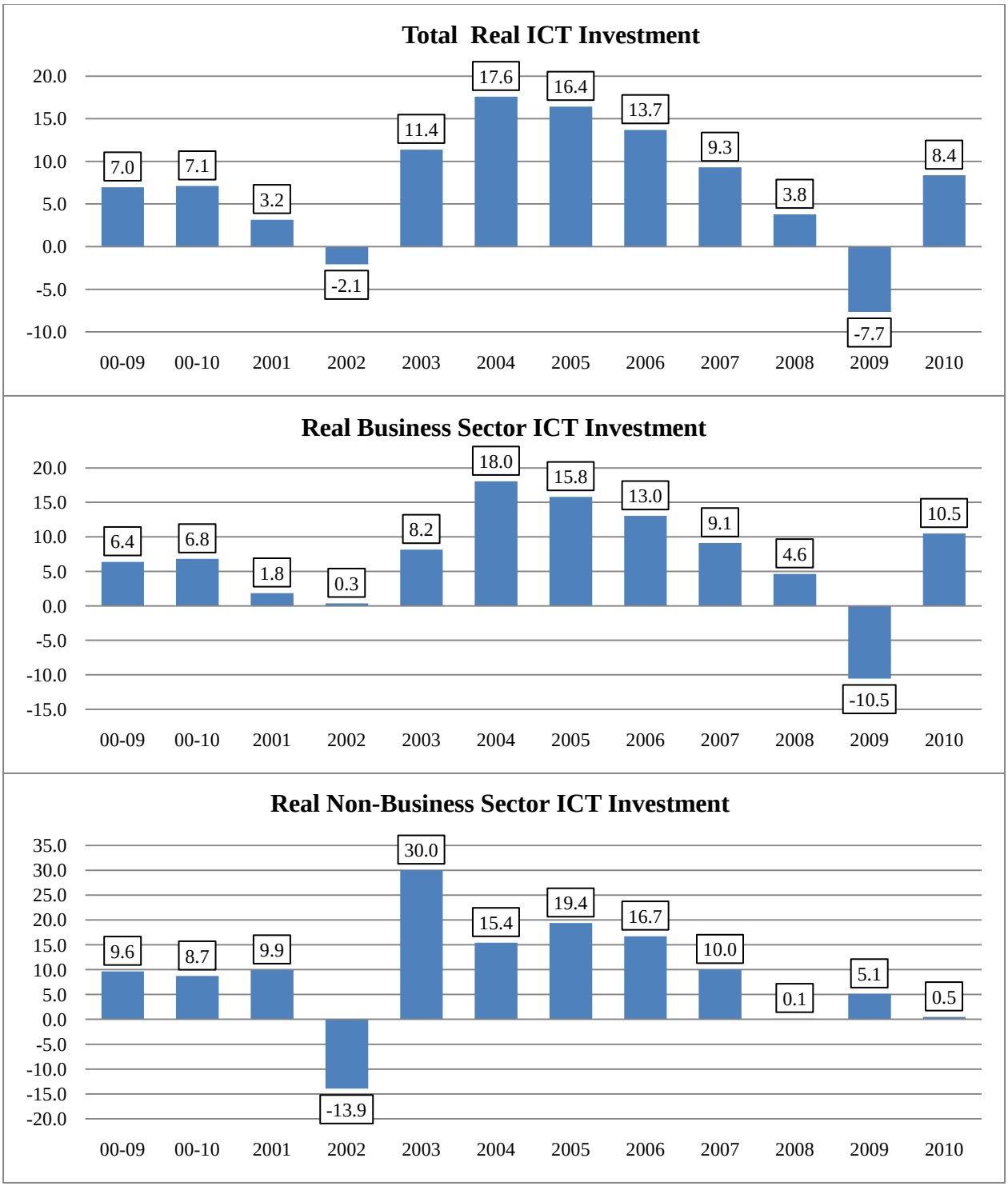
Source: CSLS ICT Database, which was built using Statistics Canada estimates.

Chart 13: Total ICT Prices (2002 base year) and Canada-US Exchange Rates (Canadian cents per US dollar), 2000-2010 (Annual Growth Rates, per cent)

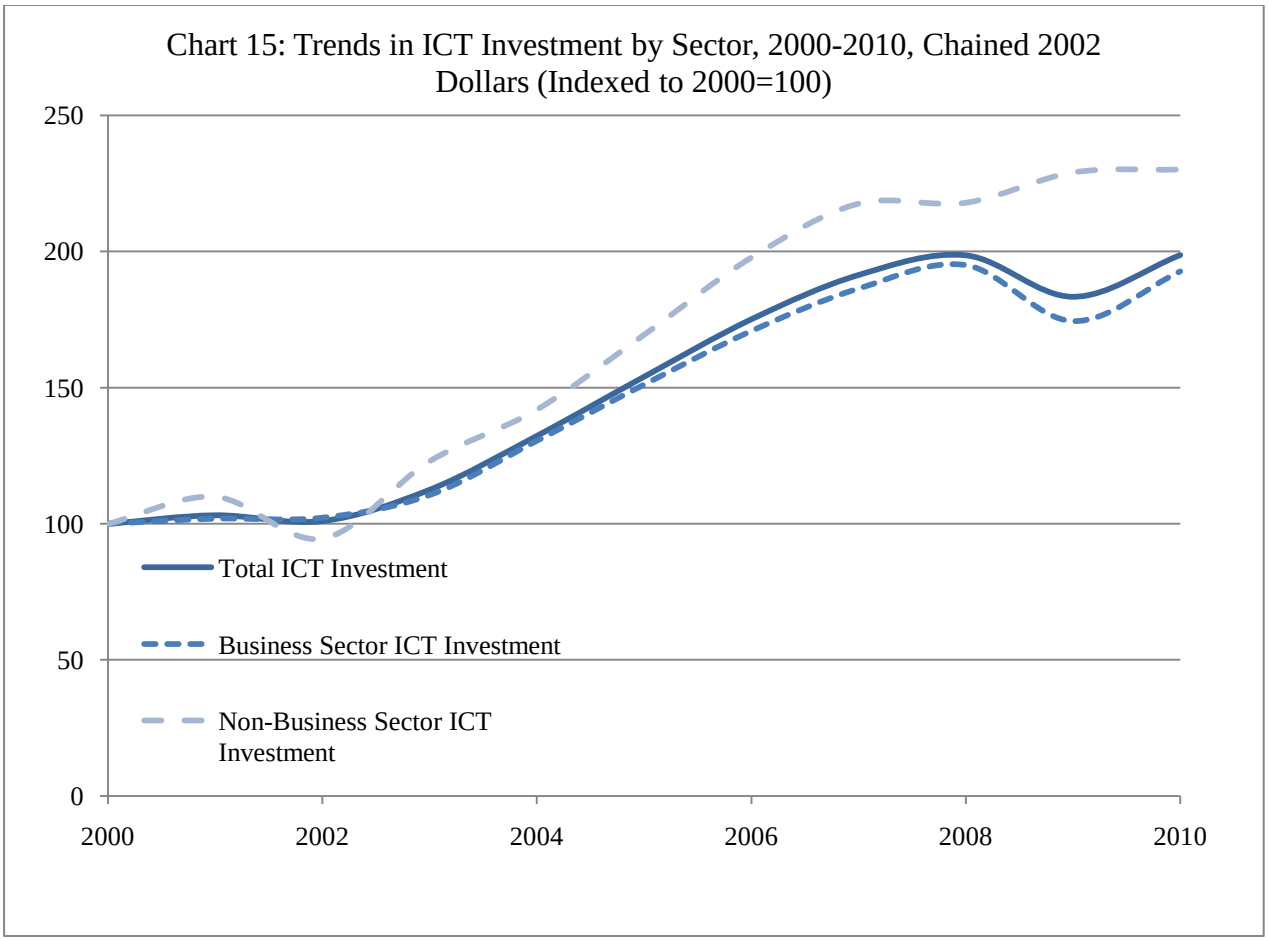


Source: CSLS ICT Database, which was built using Statistics Canada estimates.

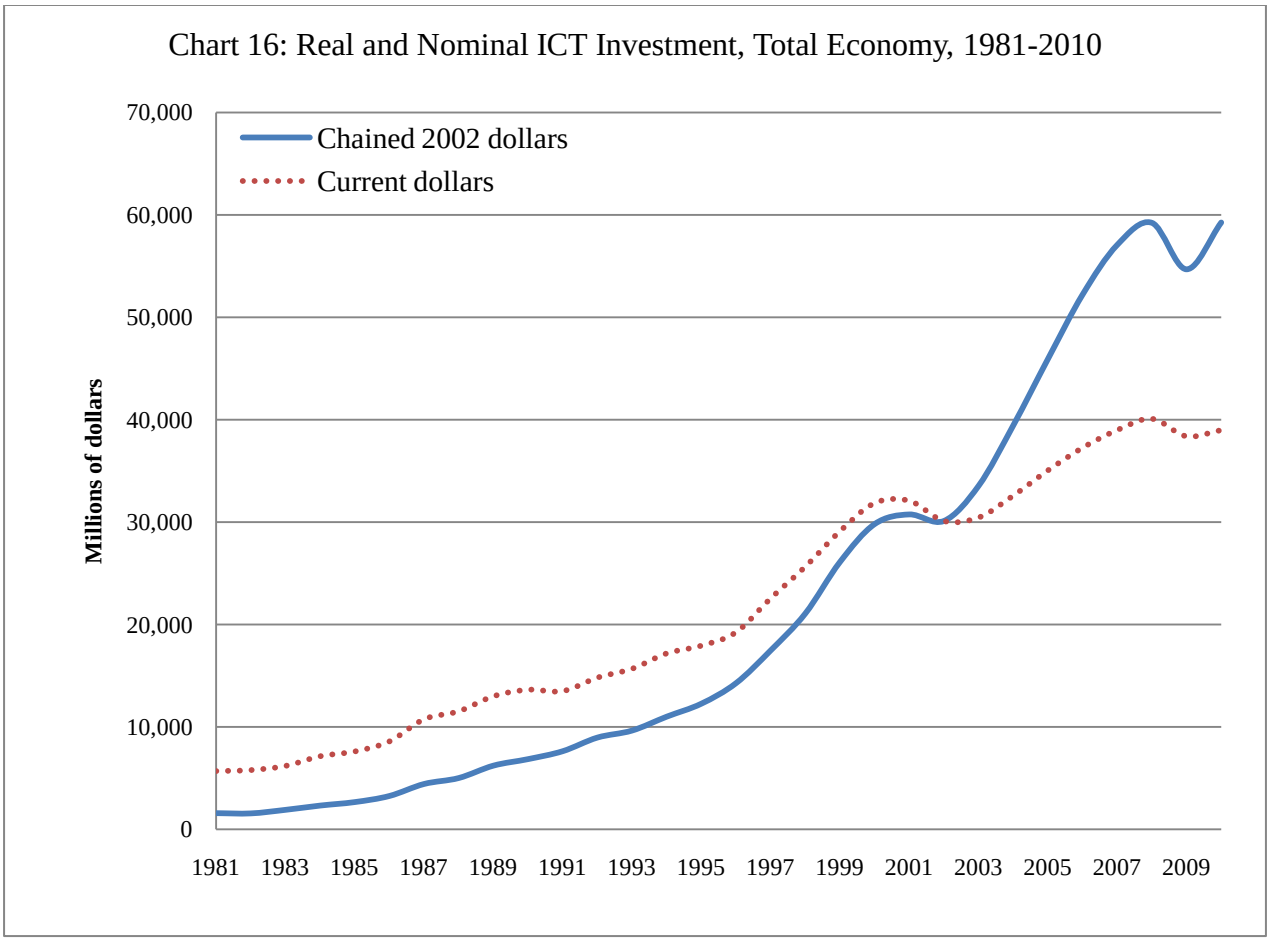
Chart 14: Trends in Real ICT Investment by Sector, 2000-2010, 2002 Chained Dollars
(Average Annual and Annual Growth Rates, per cent)



Source: CSLS ICT Database, which was built using Statistics Canada estimates.

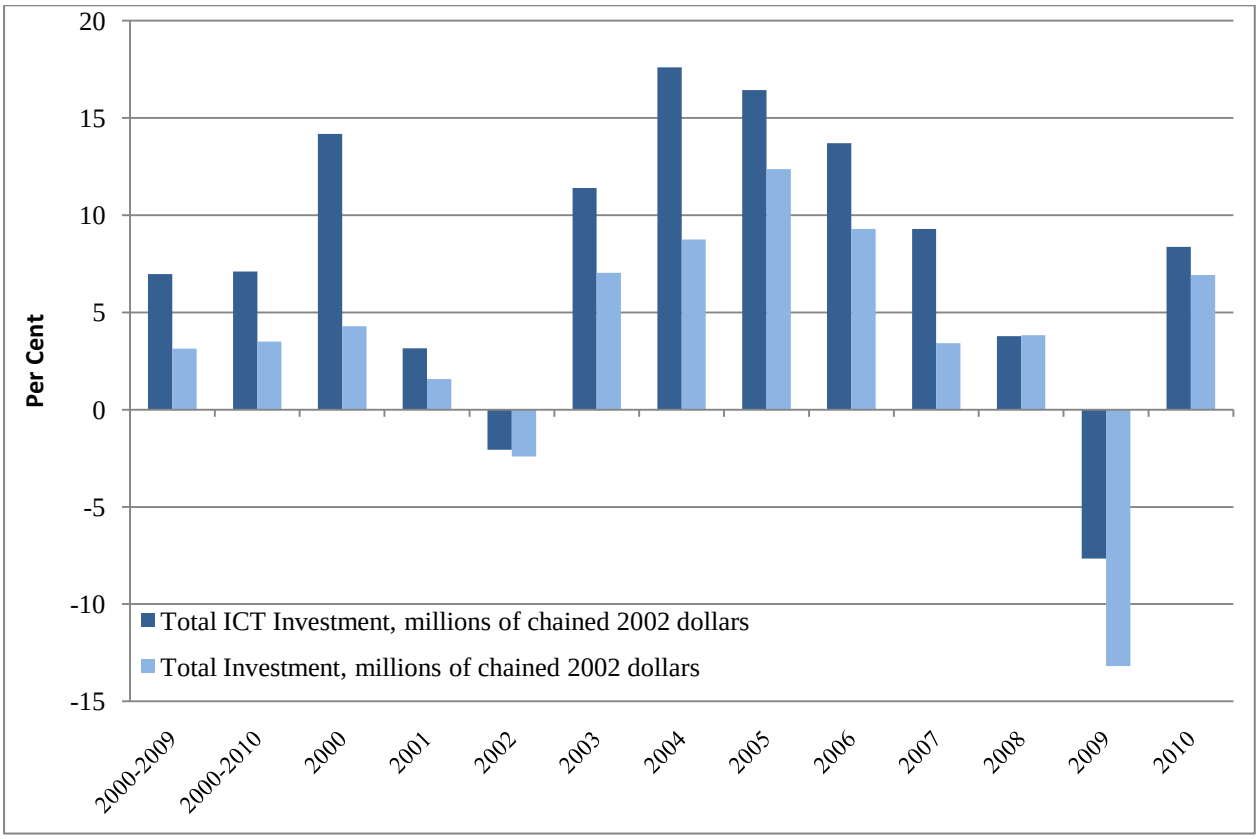


Source: CSLS ICT Database, which was built using Statistics Canada estimates.

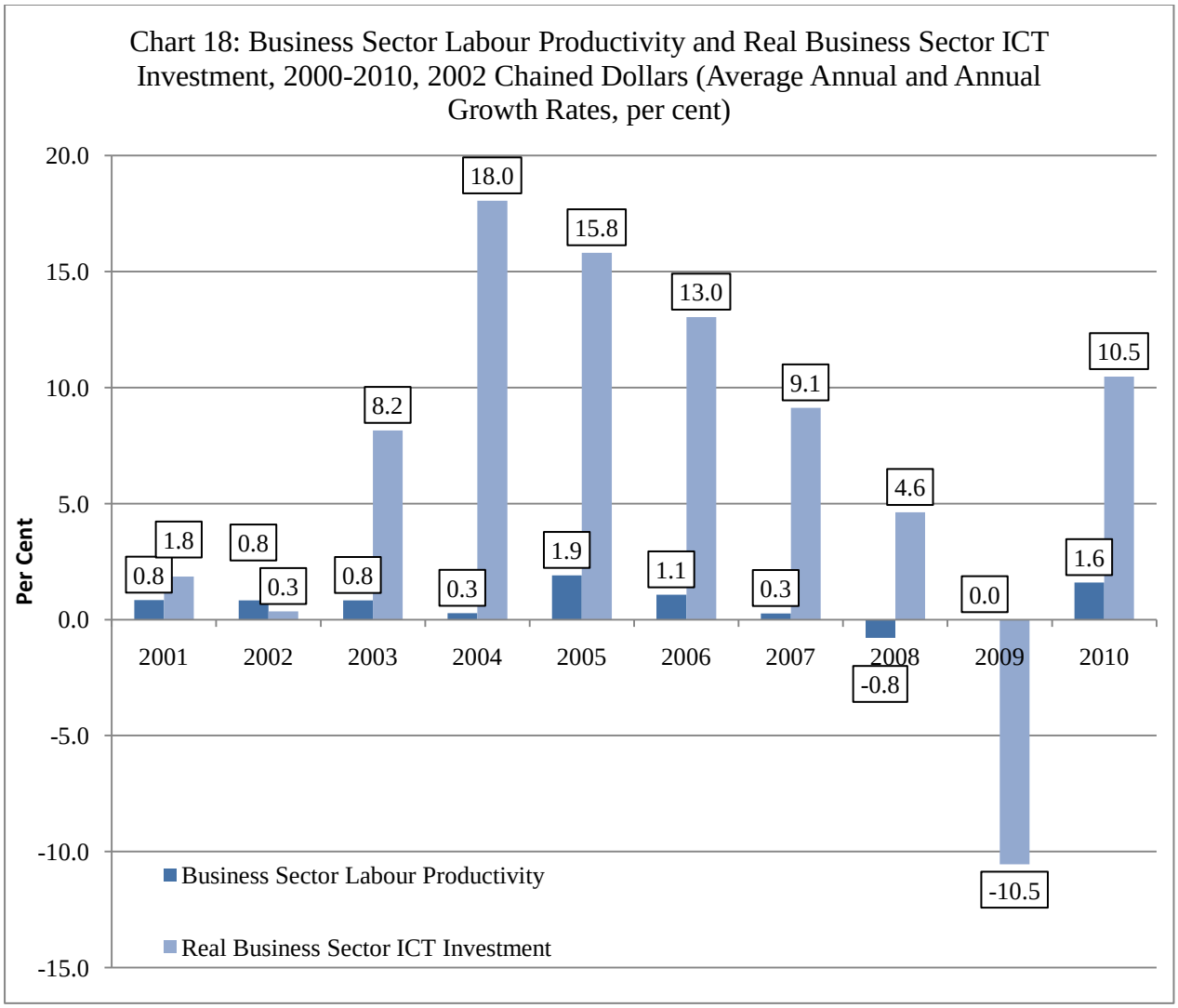


Source: CSLS ICT Database, which was built using Statistics Canada estimates.

Chart 17: Total Economy ICT Investment and Total Economy Investment (Fixed, Non Residential), 2000-2010, 2002 Chained Dollars
(Average Annual and Annual Growth Rates, per cent)

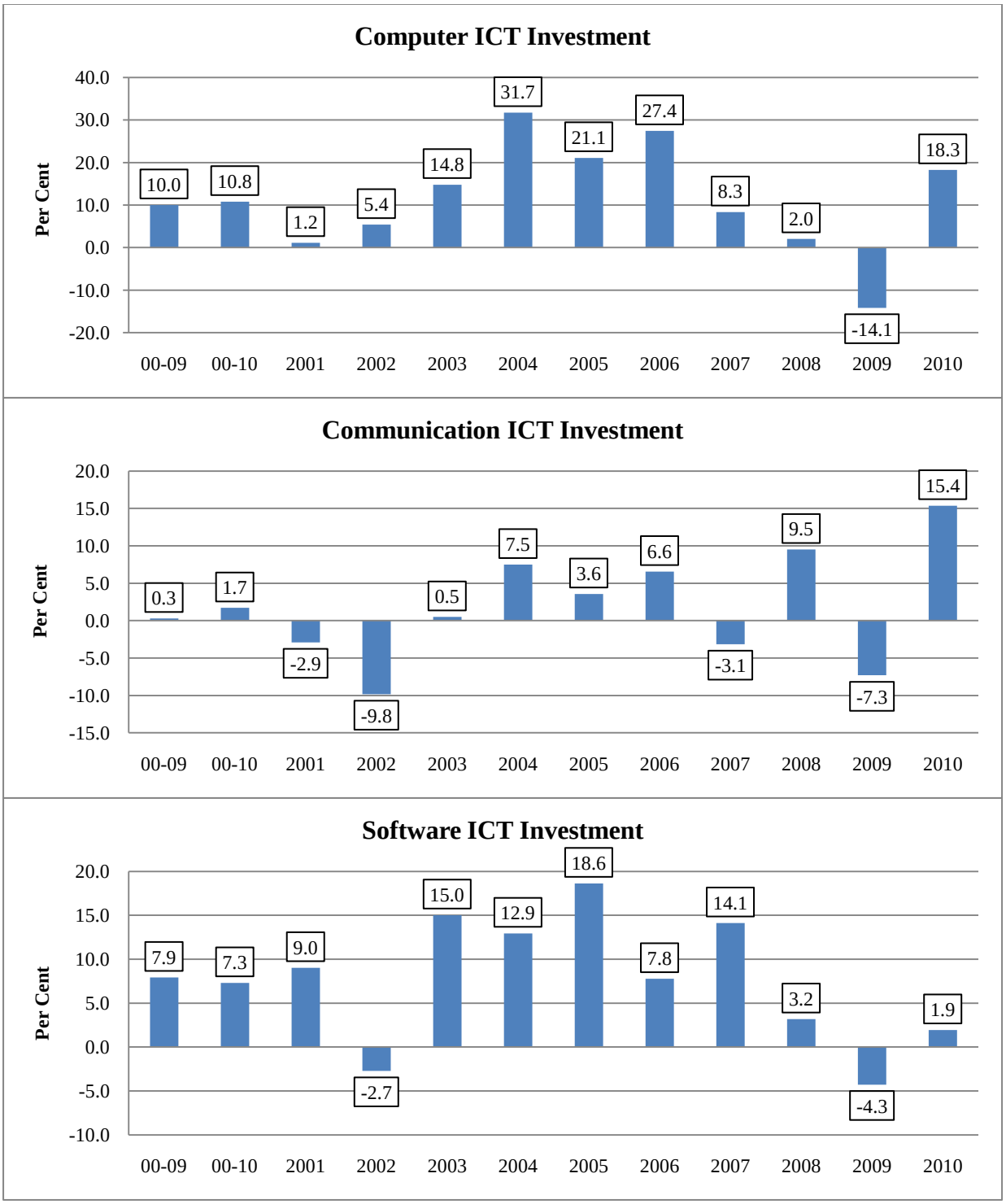


Source: CSLS ICT Database, which was built using Statistics Canada estimates.

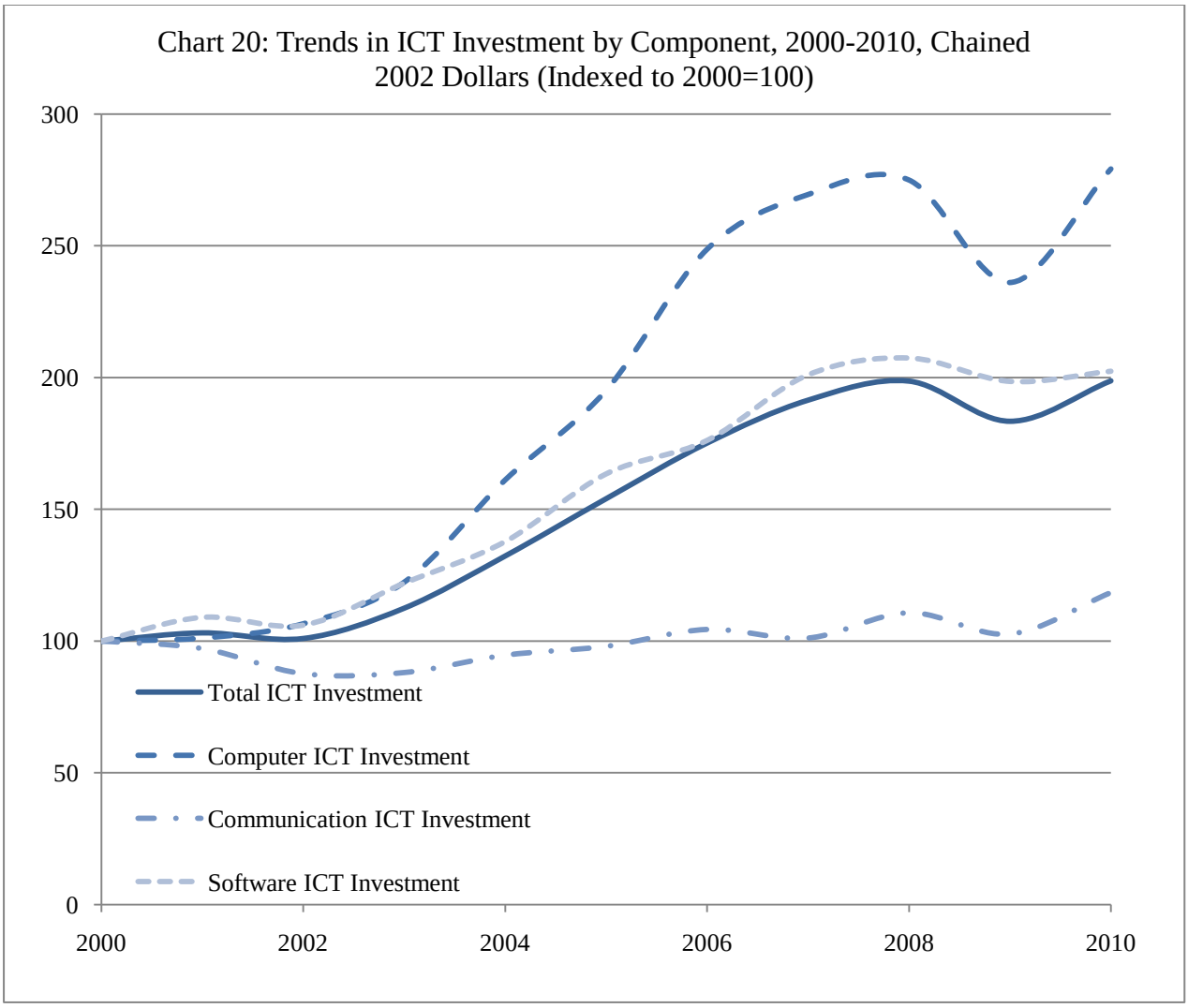


Source: CSLS ICT Database, which was built using Statistics Canada estimates. Labour productivity data is from Statistics Canada, CANSIM Table 383-0008.

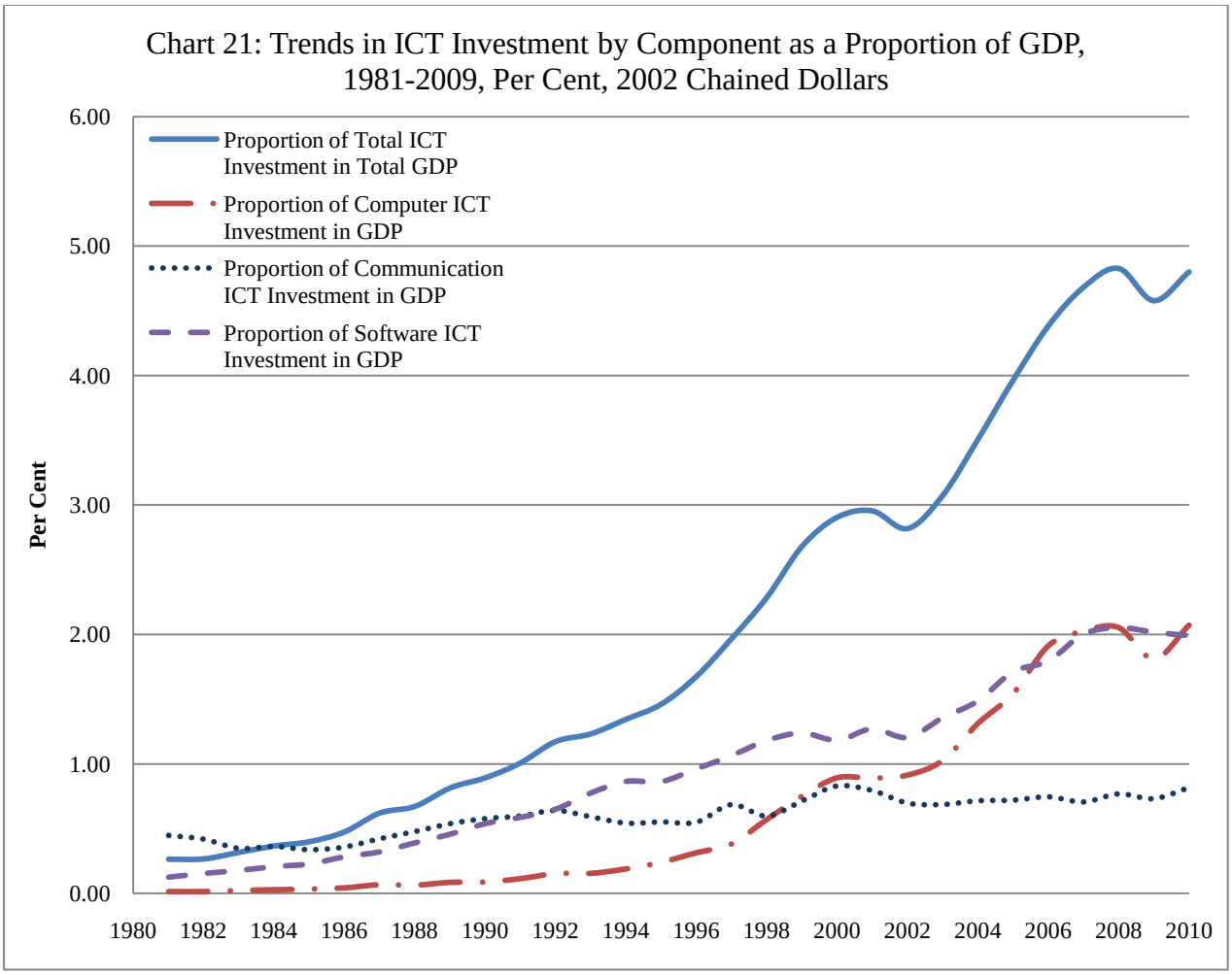
Chart 19: Trends in ICT Investment by Component, 2000-2010, 2002 Chained Dollars
(Average Annual and Annual Growth Rates, per cent)



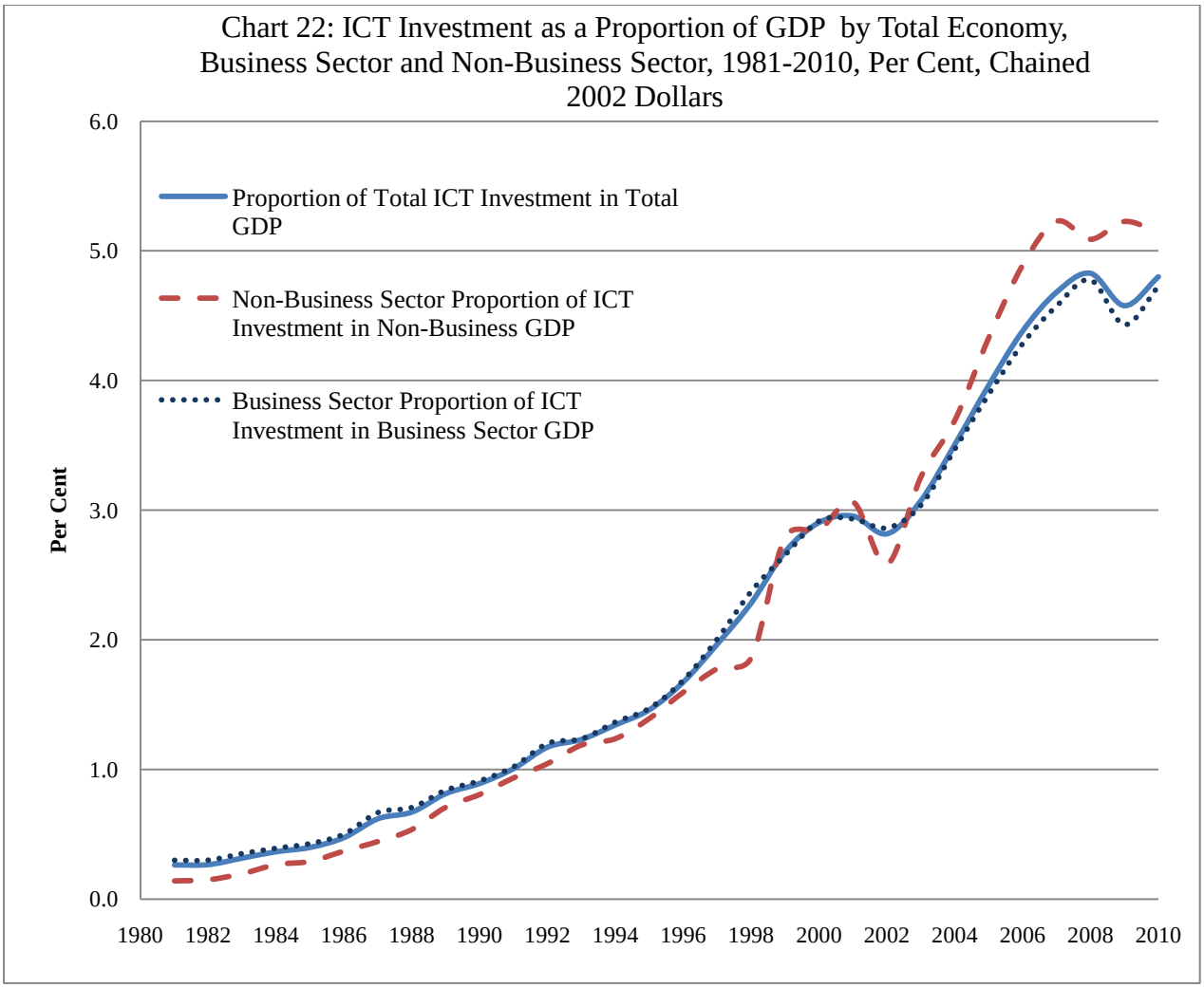
Source: CSLS ICT Database, which was built using Statistics Canada estimates.



Source: CSLS ICT Database, which was built using Statistics Canada estimates.

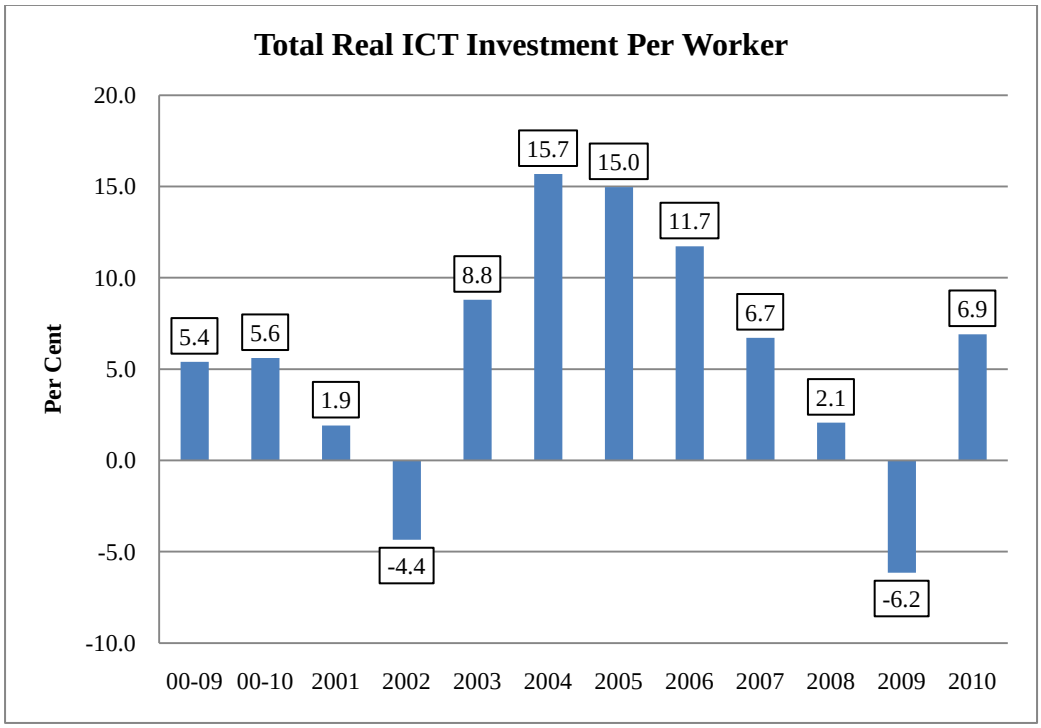


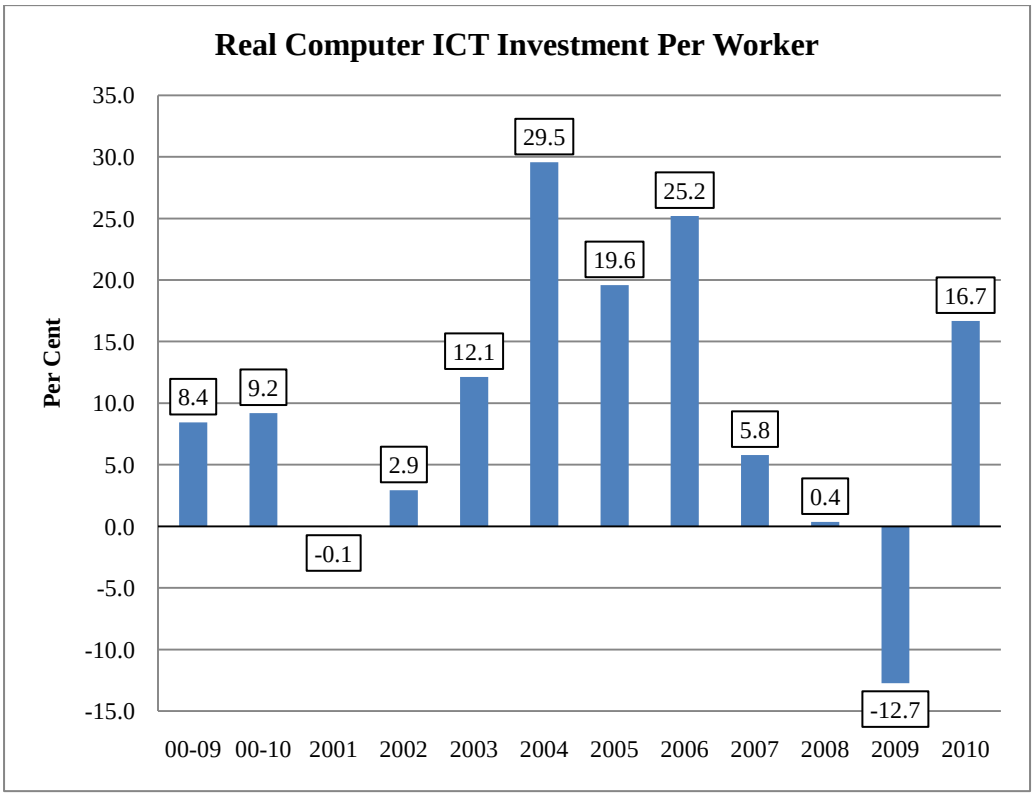
Source: CSLS ICT Database, which was built using Statistics Canada estimates.

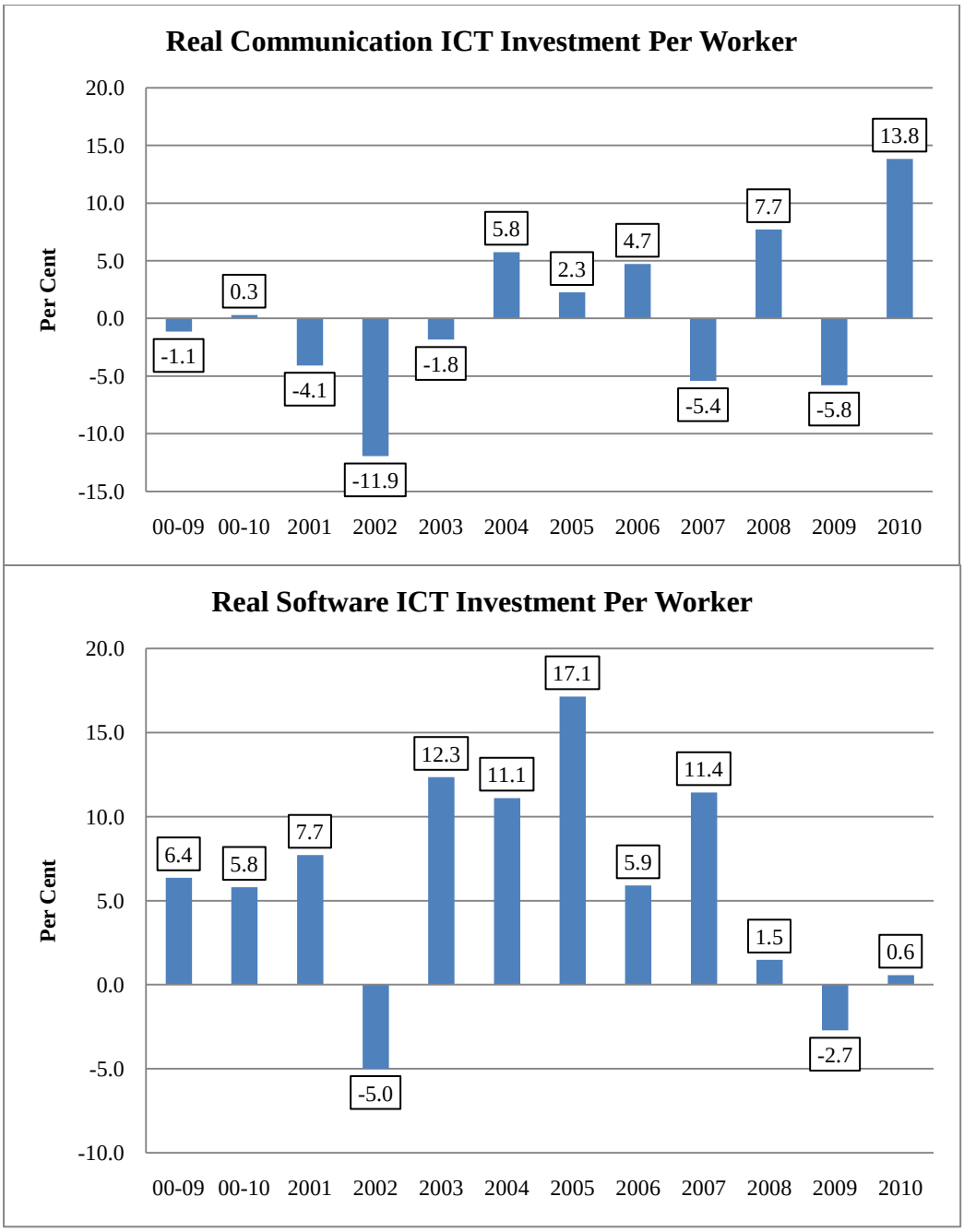


Source: CSLS ICT Database, which was built using Statistics Canada estimates.

Chart 23: Trends in Real ICT Investment per Worker by Component, 2000-2010, 2002 Chained Dollars (Average Annual and Annual Growth Rates, per cent)

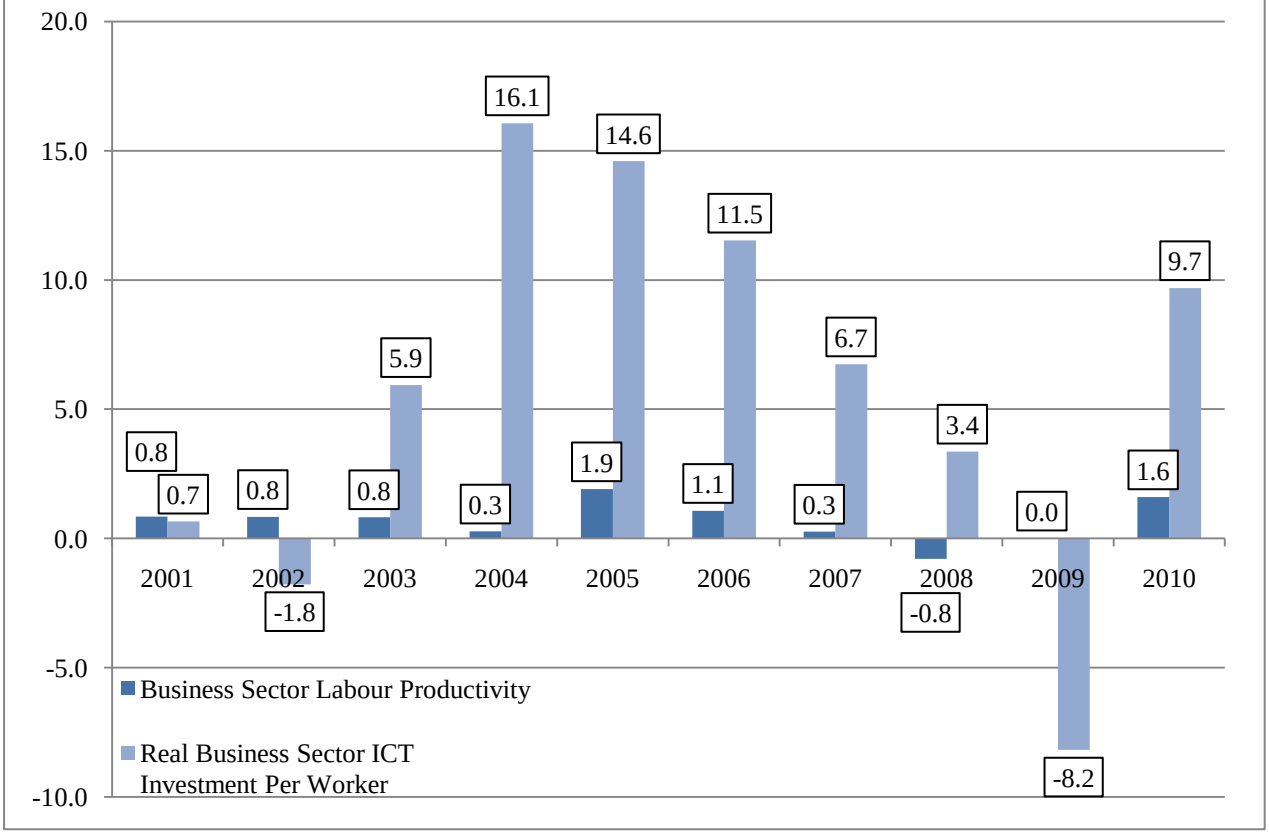






Source: CSLS ICT Database, which was built using Statistics Canada estimates.

Chart 24: Business Sector Labour Productivity and Real Business Sector ICT Investment Intensity, 2000-2010, 2002 Chained Dollars (Annual Growth Rates, per cent)



Source: CSLS ICT Database, which was built using Statistics Canada estimates. Labour productivity data is from Statistics Canada, CANSIM Table 383-0008.