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# ECONOMICS 303Y1

# The Economic History of Modern Europe to 1914

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## Lecture Topic No. 11:

## III. GREAT BRITAIN AS THE UNCHALLENGED INDUSTRIAL POWER, 1815 - 1873

### A. Trends and Price Movements, 1815-1873

## V. GREAT BRITAIN AS THE UNCHALLENGED INDUSTRIAL POWER, 1815-1873

### A. Trends and Price Movements, 1815-1873

1. **The Era of British Economic Hegemony, 1815 - 1873:**

These years from the end of the Napoleonic Wars in 1815 to the financial crisis of 1873, which ushered in the so-called 'Great Depression of 1873-1896 — these six decades from 1815 to 1873 -- mark both the completion of the British Industrial Revolution and Britain's decisive economic hegemony in the world: in industry, shipping, trade, and banking.

2. **We stop at 1873 for this section, not just because of the so-called 'Great Depression,'** but:

a) **because the 1870s marks the end of British industrial hegemony,** as both Germany and U.S. provide strong challenges and then overtake Britain in certain crucial industrial fields before World War.

b) **So after this section we must next go to the continent:** to examine industrialization of France, Germany, and Russia: and then return, for the final section, to Great Britain, 1873-1914.

3. **An Examination of the major trends, cycles, and price movements from 1815-1873.**

a) **This will help provide an overview of the major structural changes:** those that occurred in the British and European economies in this era; and will help demonstrate the intrinsic instability of the industrializing British economy, especially as it became more dependent on international trade.

b) Monetary and price aspects of this will also set next topic of banking in better perspective.

**4. Main Cycles: 1815-1873, with two major trend periods**

a) **1815-1842:** Completion of the Industrial Revolution, with very uneven growth in form of two depressions and two booms. Deflationary.

i) **1815-1821:** Post Napoleonic War depression, with very painful reconversion to a peace-time economy; very painful for agriculture.

ii) **1821-25:** post-war recovery and boom, especially based on Latin American trade and investments, with speculative boom.

iii) **1825-6:** financial panic, credit collapse, sharp recession

iv) **1826-1836:** recovery and then rapid boom, based especially on heavy railroad investments, but also cotton & iron; American investments

v) **1836-1842:** Financial crisis, which began in the U.S.; and American credit collapse 1836-9 produced

severe depression in Britain, and unemployment, with the nadir in 1841-2. (Also British internal causes)

b) **1842-1873:** Secular Upswing, Expansion, & Boom: 'Growth by Leaps and Bounds'. In general, an inflationary period. Marked the greatest expansion of the British economy and its decisive hegemony.

i) **1842-45:** recovery and renewed investment boom, domestic and foreign 2nd major railway boom.

ii) **1845-47:** financial crisis, disastrous harvests, bank failures.

iii) **1847-57:** recovery, strong expansion and boom: 'Golden Age' especially aided by California and Australian gold-mining booms and rapid expansion in both foreign trade and foreign investments.

iv) **1857-58:** financial crisis, briefly interrupting the boom, again resulting from an American financial crisis; but no real recession.

v) **1859-1866:** renewal of boom, and continued upswing, marking start of

**5. <u>Significance of Price Movements</u>**

a) **Marc Bloch:** 'Monetary phenomena are like a seismograph that not only registers earth tremors, but sometimes brings them about.'

i) **That means that price trends,** while reflecting changes in economic activities, may certainly also influence the course of economic activities:

(1) higher prices, if they raise profits, may encourage more investment and business expansion;

(2) falling prices may conversely so constrict profits and interest as to discourage investment and production (i.e. if costs don't fall with wholesale prices).

ii) **If you are familiar with the debate on the 16th-century Price Revolution (which I did mention much earlier in this course),** you may have seen that the major forces influencing or governing price movements may be classed under two headings: monetary, and real.

(1) Just as in the 16th Century Price Revolution, so in many subsequent periods, including the 19th and 20th centuries, debate continues to rage as to which was or is the more important.

(2) Today those who favour the so-called 'real' approach are generally followers of Keynes and the Keynesian school; those who favour the 'monetary' approach, or Nobel-prize winner Friedman.

b) T**he Monetary Approach:**

i) M.V = P.T or better: M.V = P.y, in which y stands for *real* net national income; and thus P.y is equivalent to NNP or NNI at current prices. [But most data are in terms of GNP, unfortunately]

ii) **Quantity Theory School:** maintains that Velocity and T are to be considered constant, or mutually balancing (as V moves up, so does y or T), so that essentially changes in the quantity of money determine prices.

iii) Money: consists of coins, banknotes, chequing deposit accounts in the bank, short-term credit instruments, like bill-of-exchange, etc.

iv) Bank-notes or paper money: note that, with the exception of the Napoleonic War period, from 1797-1815, the supply of printed banknotes was a function of the gold supply, until World War I.

(1) That is, all banknotes were cashable on demand for gold coins, or gold coins were exchangeable into notes on demand; thus banks issuing notes had to be sure of enough gold on deposit to redeem or exchange those notes; and hence it was dangerous to issue banknotes above gold reserves; and when gold reserves fell, note issue contracted; when they rose, it expanded.

(2) Chequing account-deposits, however, show no such fixed relationship to gold supplies; so that gold only partially determined money supply.

v) **Effect of increased gold supplies: banks receiving the gold will issue notes in exchange,** thus expanding the note issue; expanded note issues will permit commercial banks to expand loans, at lower interest r. Increased loans and investments stimulate econ. activity, employment.

vi) **Decreased gold supplies:** if many merchants and businessmen have to pay for more foreign goods in gold, will have to buy gold with banknotes the money supply will contract; with reduced money supply, banks will be able to permit fewer or smaller loans, and at higher interest rates; smaller volume of loans, reduced investment, curtailed production, possibly leading to unemployment and depression, and more deflation.

b) **The Real Factors:** may be summed up by technology and investment

i) **technological innovation can obviously bring about a fall in prices by the significant cost reductions that result:** i.e. revolution in cotton industry cut cost of such textiles by 90%; revolution in iron making cut prices by about two-thirds; canals cut transport costs by about one-third to one-half; and railroads even more after 1830.

ii) **Reorganization of factors of production may also be cost-cutting as well as applications of inventions,** especially if such reorganization not only makes more efficient initial use of resources but increases scale of production to achieve those increasing returns to scale or economies of large scale, with falling marginal costs, that you learn in ECO 100Y, and 200Y, etc.

iii) The so-called agricultural revolution, with enclosure, of the 18$^{th}$ century; the factory system of

production; again the canals.

iv) **Hence the significance of investment as a 'real force' in price changes; but investment may have different effects on prices:**

(1) cost-cutting and price reducing effects: to summarize what have been said: the 'real' factor of investment may lead to falling prices if that investment involves cost-cutting technology, more efficient use of factors of production, and increasing returns to scale. But above all investment, to be price-reducing, must produce quick returns, in the form of consumer goods and services. Why? Because investment involves the creation of new incomes, and must be goods to match incomes.

(2) thus, inflationary impact of investment: arises when the investment projects take a long-time to complete and even longer to produce their fruits in the form of added consumer goods and services. For example, transcontinental railroads; but also large steel mills, electrical power stations. Larger the scale, longer the term of investment.

v) **Why inflation?** To repeat the fact that such investments create immediately new incomes with no extra consumer goods to match it. Hence demand, in form of money incomes, rises faster than supply.

vi) **Warfare:** obviously particularly inflationary form of such investment. Large expenditures and income with no goods created.

vii) **Long-term view of investment:** as technological & entrepreneurial changes dictated larger forms of industrial enterprise with heavier capital investments, such investments if occurring together in economy, could be inflationary in the short run, but deflationary in long run.

viii) **Note also that investment contractions can lead to depressions and unemployment, which in turn will be deflationary.**

(1) That is, prices will fall because current supplies of goods exceed demand - i.e. demand falls with both contraction of investment spending & unemployment so that producers have to cut prices to move their goods.

(2) A downward spiral of prices can result, as less efficient producers are forced out of business by losses, and as people reduce spending in anticipation of further price falls. (Self-justifying price-decrease).

ix) **Other Real Factors:** in particular demographic forces, of the effect of, say, a growth of population and thus a growth in the number of people demanding goods and services. That can obviously lead to a price-rise, if production and supplies do not also increase; and especially if there are relatively fixed natural resources and land to meet that growth in numbers. (As in 16$^{th}$-century Price Revolution). Hence, with

population growth & no technological change, see prices of foodstuffs, fuels, basic raw materials rise (but other prices not so.

**6. <u>Business Cycles and Economic Trends: Simiand's A and B Phases</u>**

a) **the A Phase:** generally inflationary, marked by increased investments and economic activity, new settlements; rising population, etc.

b) **the B Phase:** generally deflationary, marked by reduced investments and contracted volume of business activity, often as depressions; sometimes also by falling population, and contraction of settlement.

7. **<u>Specific Explanations of Price Movements: from 1815 to 1873</u>**

a) **From 1815 to early 1840s:** a mixed and mild B Phase, with generally a downward swing in prices, and interest rates.

i) **The Monetary Factors: twofold**

(1) first has to be seen in perspective of preceding period of rampant inflation during war-years of 1790s to 1815: war itself was highly inflationary, but a very serious monetary factor was the so-called Paper Pound of 1797-1815. With threat of French invasion in 1797, Bank of England suspended gold payments, for their notes. Result was a horrendous issue of paper banknotes, unchecked by need to have gold reserves.

(2) Once Napoleonic wars were over, Bank of England restored a convertible gold currency, and forced private banks to do likewise. Hence a very significant contraction in the money supply resulted, to match gold supplies.

(3) also there had been no significant new mining of precious metals, since Mexican silver mining boom of mid-18th century; and Brazilian gold mines were evidently suffering from depletion. Thus stock of precious metals diminishing, or not expanding to meet needs of a greatly expanding European & especially British economy.

ii) **Real side:** the character of investments. In this period, the great bulk of investment was in very productive enterprises, especially so since this period had no serious warfare to drain off capital. Most of enterprises were of short-run character, producing quick returns on investment — even the early railroads, which involved no great distances.

iii) **technology perhaps the major reason:** for this was the period that the Industrial Revolution had its greatest impact in creating mass-production methods sharply reducing costs.

(1) Epecially in cottons, with the power loom from the 1820s; the iron industry with Neilsen's

hot blast from 1829;

(2) mass application of steam engineering; and impact of railroad in sharply reducing transportation costs & thus production costs.

iv) **agriculture:** experienced very sharp falls in prices after 1815, as Enclosure and modern techniques finally brought forth their fruits of rising productivity; period in which output overtook population growth; but also unhindered food imports (except for the Corn Laws — later)

b) **Late 1840s-1873:** 'Growth by Leaps and Bounds': period of general inflation, rising interest rates and profits as well as prices.

i) **monetary factors:** in two respects

(1) Great gold mining booms of California and Australia: vastly increased the world's gold supply; and gold had now displaced silver as the chief monetary metal and basis of credit.

(2) Expansion & improvement of banking facilities, not just in Britain but also continental Europe and America. As we shall note later, there was a considerable growth in cheque transactions and also of discount houses that supplemented banks in discounting all kinds of commercial paper.

ii) **real side:** the character of investments.

(1) Rostow argued that there was a shift of capital investment to less productive uses, especially in the form of significantly increased warfare (Europe, U.S., Asia) that had the effect of generating income without providing consumer goods to absorb that income.

(2) The same can be said of gold mining investments.

iii) **Equally important was shift in investment more and more to longer-term enterprises:** i.e. involving a much longer period before returns on the original investment were achieved, involving a much longer period before producing a lower cost structure.

- Also technology less dramatic in cost cutting, evidently. Major examples of such longer-term investments are the construction of vast and far-flung railway networks in Europe, the Americas and Asia (as compared to short lines in Britain).
- Also investment booms in steam and iron shipbuilding; construction of steel mills; in general, the building of the infrastructure necessary for European and American industrialization.

8. **<u>Changing Character of Business Cycles, 1815-1873</u>**

a) **Capital investment:**

i) **including both domestic and foreign or overseas investments,** may have played the predominant role in the economic swings — the booms and recessions — from 1815 to 1973. ii) **Certainly as the trend became accentuated from at least the 1840s to much larger scale forms of industry and enterprise,** involving much more complex technologies, the capital investment cycle became a predominant force in the secular trends as well as business cycles because of larger volume.

b) **Business crises and recessions were, by and large, started:**

i) by financial crises that came at the height of capital investment booms

ii) most of the crises resulted from an imbalance between too much fixed capital investment and thus too little in the way of working capital investments, and thus too little liquidity.

iii) High interest rates and profits evidently attracted too much capital into very long term capital investment ventures

iv) Thus, in relation to the greatly expanded production facilities made possible or created by this scale of capital investments, there was a relative shortage of working capital to meet the day to day needs of business operations, in terms of financing the wage bill, maintaining inventories, etc.

v) Thus a crucial lack of liquidity and lack of funds to permit businesses to maintain their daily operations when the trade cycle slackened or when credit became tighter -- a general lack of resilience in the economy.

c) **Other Factors in the Business Cycles:**

i) **Other Major Factors in the Business Cycles: capital investments were not the only factor in business cycles:** there were three others, very volatile factors, that explain more of short-term fluctuations: (1) inventory or trade cycles, (2) speculative fevers in securities, (3) the role of the harvest — high vs. low grain prices. These three all are more important in first phase B than in second phase A.

ii) **Up to the 1840s,** the dominant features seem to be inventory cycles, grain harvest fluctuations, and speculative fevers

iii) **From the 1840s to the 1870s:** investment cycles became more and more predominant, especially with the dual transportation revolutions and the spread of industrialization elsewhere in Europe, the Americas, and the rest of the World.

d) **The inventory or trade cycle, up to the 1840s: with speculation and impact of grain harvests:**

i) **trade inventories were stocks of goods that manufacturers & merchant maintained in anticipation of sales:** We begin by supposing that they are encouraged to build up their inventories in response to expanded overseas trade, higher prices, etc. & optimistic forecasts, thus encouraging the relevant industries to expand investment & production.

ii) **The critical problem was one of overexpension,** especially since most would be acting on the same types of information, often imperfect & certainly out of date, with slow transport & communications.

iii) **Thus with imperfect knowledge,** production might well expand beyond the capacity of domestic and foreign markets to absorb it all.

iv) **Speculation:** was especially the consequence of great imperfections in transportation and communications, ie. before railroads and the telegraph; and thus before changes in market conditions could be reported back to producers, a glut would result.

v) **Once overstocking and the glut became apparent,** often a panic reaction of suppliers to slash prices to reduce their inventories, and of course immediate cessation of orders to the basic producers.

vi) **That could, and certainly did in 1820s and 1830s, result in bankruptcies in chain reaction form,** credit contraction industrial collapse, widespread unemployment thus producing a general recession/depression.

e) **Significance of Agriculture in Business Cycles:** to late 1840s.

i) Until c. 1850, agriculture still remained a major sector of the economy, and British still produced bulk of own food supply.

ii) Thus, given inelastic demand for grains, a bad harvest could have serious, damaging effects on the economy: twofold effect of high price

(1) as higher percent of income spent on food, reduction in demand for domestic industrial goods and services; but worse: -

(2) an outflow of gold to pay for increased grain imports; and gold outflow would thus reduce bank reserves, and consequently contract the paper money supply and credit, raise interest rates, have deflationary impact on the economy, on occasion seriously disruptive as in 1840s.

(3) Effect of good harvest and low grain harvests: was converse — to increase real incomes (though some reduction in agri. sector) and expand domestic consumer demand; reduce food imports, permit expansion.

4) **Harvests: there is in fact a fairly strong correlation between bad harvests and economic crisis up to the 1840s,** on the one hand; and between good harvests and upswings in the economy. Harvest hardly the only or even major reasons in either case, but was clearly important factor.

iii) **from 1850s effect of the harvest diminished considerably,** to become quite unimportant by the very late 19$^{th}$ century: Reasons:

(1) that the agricultural sector diminished to a very small proportion of the British economy by 1900 - perhaps 8%;

(2) especially as the transportation revolution permitted opening up of vast new areas of grain cultivation in Eastern Europe, the Americas, Australia, permitted cheap imports, and as industrialization provided exports to pay for food imports.

f) **In sum:** wide and sometimes wild swings in production and inventories resulted from essentially imperfect knowledge about the market and hence unsound bases for business predictions.

- These problems diminished considerably after 1840s with the great transportation revolutions in railroads and steam shipping,
- especially with such improvements in communications as the electromagnetic telegraph in 1838; but also resulted from great expansion & solidification in foreign trade with continental and American progress towards industrialization.

**9. <u>Financial Character of Business Crises, from 1842 to 1873</u>**

a) **Business crises and recessions:** by and large, were started by financial crises that came at the height of capital investment booms.

b) **Most of the crises resulted from imbalance between too much fixed capital investment with too little working capital and liquidity:**

i) that is to say, high interest rates and profits had attracted too much capital into very long term investment projects;

ii) and especially in relation to expanded production facilities from this investment, the economy had left in it too little working capital, too little liquidity to permit business firms to sustain themselves when the market became bad, and when credit became tighter, more contracted; i.e. there was not enough working capital to give the economy proper resilience.

c) **Financial Speculation:**

i) **Continued to be also major factor in crises, in both stock and commodity markets.**

(1) Speculative fevers as before fed investment booms to excessively inflated degrees, reaching point where both consumer demand for the products of investments and market skepticism about future of the boom would halt rise in security prices.

(2) Then, as before, the bubble would burst and a panic wave of selling would ensue, producing a general contraction of credit:

ii) **stocks and other such securities were often the collateral for loans,** bank credits: when value of

collateral fell, loans be recalled.

iii) **fall in stock markets seriously affect confidence in general,** and willingness to invest, to extend credit

iv) **increase in liquidity preference:** fear of falling values and fear that cash be needed cause people to convert assets to cash, to liquidate investments.

v) **Results:** Funds for both working capital and fixed capital, but in short run, especially for working capital, dry up; contraction and recession — especially in the form of business collapses, bankruptcies.

vi) **These in turn produce a panic and general credit contraction & recession.**

vii) **In sum:**

(1) wide and often wild inventory and production swings resulted from such market imperfections,

(2) and these diminished considerably with the transportation revolutions in the railroad and steam shipping, but especially with the invention of the electromagnetic telegraph in 1837/8.

d) **Fixed Capital Investments:** this aspect should not require any elaboration.

i) **You should know from Keynesian macro-economics how and why large fixed capital investments in,** say, railroads, steam shipping, munitions, steel mills, etc. could have a strongly inflationary multiplier and accelerator effect; and how sudden cessations of such investments would have a decelerator, deflationary effect on the economy.

ii) I have already commented why, especially with spread of Iindustrial Revolution abroad, this became a much stronger force from the 1860s.

e) **Financial Speculation, Financial Crises:**

These were nothing new, as we have seen in particular with the 1720 South Sea Bubble; but they became more important after 1805, especially as Great Britain began investing more and more heavily in North and South American trade, and in N & S American government bonds (national and state). Problems:

i) **great imperfections in the investment institutions & machinery:** the absence of joint-stock company structure for most commercial enterprises the primitive stock exchange facilities, restrictions on banking organization until 1830s.

ii) **the inability or failure of the Bank of England to act as a proper central bank,** its refusal to give up role as competitive private bank until 1870s, a major problem explaining financial volatility.

iii) **grossly inadequate knowledge of foreign conditions,** combined with very heavy investments in foreign government bonds: in not only North and South America, but also much of Europe — resulting from Britain's role as the banker and financier of Europe during Napoleonic wars. iv) **Evidently there was an almost naive faith in ability and willingness of foreign governments to honour their loans.** American state

gov’ts some of worst offenders.

f) **Significance of the United States:**

i) already seen that as result especially of trade patterns built up during Navigation Laws, Old Colonial System, and of other historic ties, all of which handily survived the American Revolution, the United States became Britain’s single most important market overseas (33% in 1800) by the early 19th century;

ii) and until U.S. became Protectionist after the Civil War of 1860s, U.S. was easiest most promising area for Britain to expand its exports, especially as settlement and population expanded.

iii) Cotton especially was the dominant import from U.S. in return for

iv) For all these reasons U.S. became major recipient of British overseas investment, indeed financing much Anglo-American trade: British investments, mainly in form of bonds, in American canals, then railways and mines, and especially in American state bonds.

v) Hence any American financial or economic crisis was quickly spread to Britain, especially in the form of repudiation or collapse of British credits & loans.

**BRITISH BUSINESS CYCLES AND PRICE TRENDS, 1815 - 1914**

1. **Secular Trend of 1815-1842:** Completion of the Industrial Revolution. A mild and mixed Phase B, with two depressions and two booms. *Deflationary.*

a) **1815 - 1821:** Post-Napoleonic War depression, with very painful reconversion to a peace-time economy and sudden monetary contraction.

b) **1821 -1825:** Recovery and powerful boom, based especially on Latin American trade and investments; a speculative boom period

c) **1825 - 1826:** commercial crisis, financial panic, sharp recession

d) **1826 - 1836:** recovery and then very rapid boom, based especially on large railway investments, but also in cotton and iron & the U.S.

e) **1836 - 1842:** Financial crisis generated in the U.S., with a credit collapse that spread to Britain and produced severest depression of the 19th century. Also internal causes; especially in the metallurgical and railroad engineering industries. Nadir in 1841-42.

2. **Secular Trend of 1843 - 1873:** A very strong Phase A. A Secular upswing expansion, and boom known as 'Growth by Leaps and Bounds.' Marked the period of greatest expansion for the British economy in the 19th century and decisive hegemony of the British economy. *Inflationary*.

a) **1842 - 1845:** Recovery and renewed investment boom, especially in railways (Second Railway Boom); but also in foreign trade and loans.

b) **1845 - 1847:** financial crises & disastrous harvests. Bank failures.

c) **1847 - 1857:** recovery, strong industrial expansion and investment boom. The so-called 'Golden Age' of Britain. Especially marked by the Californian and Australian gold-mining booms; and very rapid growth of British foreign trade and foreign investments and British railway building at home and abroad. Beginnings of steam-shipping.

d) **1857 - 1858:** financial panic, briefly interrupting the boom, again originating in the United States; but only a mild depression.

e) **1859 - 1866:** renewal of the boom, and continuation of the upswing, marking the start of the 'steel revolution:' and also: the fourth and major railway construction boom; shipbuilding boom; export boom.

f) **1866 - 1868:** domestic banking and financial crisis; stock market crash. Produced severe contraction and unemployment, but only briefly.

g) **1869 - 1873:** sharp recovery and major boom, especially in shipbuilding.

h) **1873:** Financial panic in Vienna, spreading to Germany, France, U.S. and Britain. Though less severe in London, did mark the end of the great secular upswing, and beginning of a 23-year secular downswing.

8. **1873 - 1896:** The 'Great Depression.' Phase B: very deflationary.

9. **1896 - 1914:** Pre-War Boom and Secular Upswing. Generally, Phase A.

**ECONOMICS 201Y and 303Y**

**MODERN QUANTITY THEORIES OF MONEY: FROM FISHER TO FRIEDMAN**

Most economic historians who give some weight to monetary forces in European economic history usually employ some variant of the so-called **Quantity Theory of Money**. Even in the current economic history literature, the version most commonly used is the Fisher Identity, devised by the Yale economist Irving Fisher (1867-1947) in his book *The Purchasing Power of Money* (revised edn. 1911). For that reason we cannot avoid it, even though most economists today are reluctant to use it without significant modification.

1. **The Fisher Identity**, or **The Equation of Exchange**: **M.V ≡ P.T**

**M** = stock of money in coin, notes, bank deposits ('high-powered')

**V** = the velocity of circulation; the rate at which a unit of money circulates in effecting transactions in course of one year; the average number of times it 'turns over'

**P** = some measure of the price level; e.g. Consumer Price Index

**T** = the total volume of monetary transactions that take place in the economy during the course of that same year.

a) **This is more of an identity (≡) or tautology than it is a causal equation**: it simply states that total spending, in terms of the money stock multiplied by the rate of its turnover or circulation, necessarily equals total spending in terms of the total volume of monetary transactions multiplied by the current price index. The two values on each side of the ≡ sign are necessarily identical.

b) **Problems with the Fisher Identity:**

i) **M** and **P,** it has been argued, are extremely difficult to estimate or calculate. For the medieval, early modern, modern, and present day eras this is a form of nitpicking that in no way invalidates the model. Good proxies can be provided for most of these eras, certainly good enough to indicate general movements of both prices and monetary stocks. The other two objections are far more important.

ii) **T** really is quite impossible to calculate for any period or even to comprehend. That is, even if we could attach a numerical value to T, it would be rather meaningless: T = the total volume of all transactions in the economy, both intermediate and final, from raw materials to fully manufactured products along with all services. How can we resolve the problem of multiple counting? How can we add up all the transactions involving so many different commodities and services: with what common denominator? Adding together apples and oranges (as pieces of fruit) is a very simple task by comparison.

iii) **V,** as a measure of the velocity of circulation or turnover of money, is not in fact an independent variable, but rather a residual one, which has to be calculated algebraically by first knowing the other three. Thus we can calculate V only by this formula: **V = (P.T)/M**

2. **The Cambridge Cash Balances Equation:** **M = k.P.T**

This is a lesser-known rival to the Fisher Identity that emerged during the 1920s at Cambridge, with a formula that resolved at least the problems concerning Velocity:

a) **Its originators at Cambridge (especially A.C. Pigou) asked two principal questions**:

(1) how much 'high-powered' money (usually called M1), do people currently wish to hold in the form of cash balances (money held in coin, notes, bank deposits), rather than being spent or invested?

(2) What, therefore, is the ratio of those cash balances to the total money value of all transactions in the economy?

b) That ratio is indicated by the letter **k;** and this form of the Quantity equation now becomes: **M = k(P.T)**.

i) The letter **k** thus indicates the proportion of the total value of all monetary transactions that the public chooses to hold in cash balances; and thus it tells us the necessary amount of **M** that is required for that level of **P.T** (total spending).

ii) Note that **P times T again equals the total monetary value** of all transactions; and thus suffers from the same problems of estimating the value of T, as indicated above for the Fisher Identity.

c) **Liquidity Preference:** a concept further developed by Keynes, who asked a fundamental question. Why do people wish to hold cash balances, instead of immediately spending or investing that money? He suggested three motivations.

(1) **transactions motive:** people hold a stock of ready cash in order to meet their day to day needs in buying goods and paying for services, etc. This is deemed to be the major need for holding ready cash.

(2) **precautionary motive:** to have ready cash on hand in order to meet some unforseen emergency, as a contingency fund for future needs.

(3) **speculative motive:** to have ready cash to take immediate advantage of some special investment opportunity -- a cash fund to speculate with.

d) **Cash Balances and Opportunity Cost:**

What is the cost of holding these cash balances?

i) The true cost is the **opportunity cost:** i.e. the interest or other investment income *foregone* by not investing those balances. Consequently, we should find that cash balances are to some extent interest-sensitive, and vary with interest rates.

ii) That is, the proportion of national income held in cash balances (**k**) should fall as real interest rates rise, because rising interest rates will increase the opportunity cost of holding those balances;

iii) and conversely that proportion **k** held in cash balances should rise with falling real interest rates.

e) **Note that mathematically, the Fisher and Cambridge Cash Balances equations are related**: k is the reciprocal of V; V is the reciprocal of k

f) **What is the difference between k and V?**

Why is k a more useful variable than V?

i) Because **k** is much more 'predictable;' and conceptually **k** is an 'active' variable -- i.e. we should be able to predict roughly what proportion of total national expenditures people wish to hold in cash balances.

ii) But **V**, on the contrary, is a passive (i.e. resulting from) or 'residual' variable, calculated as noted only by first knowing M, P, and T.

iii) Thus one might say that **k** (cash balances) is a **predictive** measure of velocity, while **V** measures only resulting velocity.

## 3. The Basic Suppositions Concerning the Older Quantity Theories of Money

a) **The Demand for Money is chiefly a TRANSACTIONS DEMAND:**

b) **The Transactions Demand for Money will be proportional to the aggregate value of transactions (i.e. k as proportion of P.T);** and this proportion will not vary in the short run;

c) **The Supply of money is exogenously determined,** determined independently of the economy (by some external authority or events).

d) **Full Employment prevails:** so that any increase in aggregate demand will not increase the volume of output or transactions (T);

e) **Those with excess money will spend it on goods and services;** those with insufficient supply of money will cut their expenditures on goods and services.

f) **The Transactions Velocity of Money is, at least in the short run, very stable.**

## 4. The Modern Form of the Quantity Theory: Friedman's Income Version

a) **While the Cambridge cash balances approach apparently resolved the problem of V,** it did not resolve the quite intractable problem of T. Modern economists, however, have more or less resolved that

problem by ignoring the total volume of transactions, and by looking instead at the Net National Income or the aggregate of net national expenditures.

b) **To understand this, we can begin with the Gross National Product or its equivalent,** the Gross National Income: as the total current money value of all final goods and services produced in the economy in a given year.

i) From that dollar amount we deduct a sum for 'depreciation' (for depreciation of worn out, wasted capital stock) in order to arrive at Net National Product. Thus, just as Gross National Product (GNP) = Gross National Income (GNI), so Net National Product (NNP) = Net National Income (NNI), which is represented here by the capital letter Y. That letter Y will be familiar to anyone who has studied at least the rudiments of Keynesian economics:

**Y = C + I + G + (X - M).**

ii) That is, Net National Income (Y) equals the sum of total national Consumption (C) plus total Investment (I) plus Government Expenditures (G) plus the net difference between total Export incomes (X) and total expenditures on Imports (M).

c) Since this value **Y** is usually expressed in terms of current dollars, we must now express that net national income in dollars of unchanging values, i.e. in what are called 'constant dollars' that reflect a constant or stable purchasing power, which has been adjusted for inflation (thus the term: 'deflated net national income').

i) That value of a deflated NNI, or 'real NNI,' or 'net national income in constant dollars,' is expressed by lower-case **y.**

ii) Upper-case **Y** of course measures NNI in current dollars, which currently has meant a declining purchasing power, because of inflation.

d) This new value **y** or real **NNI** is obviously much more measurable than **T.** To calculate **y:** divide **Y** by **P.** That is, calculate the NNI by deducting depreciation from the GNP; and then divide that result (NNI) by some agreed upon price index (e.g. consumer price index): **y = Y/P**.

i) For example: the value of the Gross Domestic Product in 1995 was $776.30 billion. Divide that amount by the GDP Price Index (whose base is 1986 = 100), which is 134.0 -- i.e. meaning that this price index is 34.0% higher than the weighted average of prices for all items in the price basket for 1986. The result (divided by 1.34) is $579.33 billion, which is the 'real' GDP for 1995 in constant 1986 dollars.

ii) Unfortunately the data currently available are for GDP only, not for NNP; and these GDP data will have to serve as proxies for Y and y.

e) So, by using that **'y'** value to express constant or deflated net national income (NNI), in place of unmeasurable T, in the two quantity theory equations, those Fisher and Cambridge equations now become:

i) Fisher: **M.V = P.y**

Thus **V** measures the income velocity of money: the rate at which a unit of money circulates in producing total net national income (or net national expenditures or net national product).

ii) Cambridge Cash Balances: **M = k.P.y** or, **M = kPy**

Thus **k** measures the proportion of aggregate national income that the population collectively holds in cash balances.

iii) While the Cambridge version is conceptually preferable, it is mathematically related to the much more widely used Fisher equation, or better the modern income version of that equation (k = 1/V). So you will presumably also prefer to use it: but at least please use it in this modernized form: **M.V = P.y [MV = Py]**

iv) **Examples for 1995**

(1) **M = k.P.y** **k = M/(P.y)**

$M_1$ = \$57.14 billion
P = 134.00
y = \$579.33 billion

GDP = P.y = 1.34 x \$579.33 billion = \$776.30 billion

**k** = 57.14/ (1.34 x 579.33) = 57.14/776.30 = 0.07360556

[Thus cash balances in high-powered money $M_1$ = 7.04% of the total GDP (in current prices)]

(2) **M.V = P.y** **V = (P.y)/M**

$M_1$ = \$57.14 billion
P = 134.00
y = \$579.33 billion

**V** = (1.34 x 579.33)/ 57.14 = 776.30/57.14 = 13.586

**k = 1/V** k = 0.07360556; 1/0.074 = 13.586

f) **<u>What factors affect V and k?</u>**

i) **Any changes affecting those three elements of liquidity preference**: for the transactions, precautionary, and speculative demands for money.

ii) **Changes in population**: population structures, market structures, transaction costs, etc. requiring that a greater or smaller proportion of national income be held in cash balances.

iii) **Changes in financial instruments**: many of which economize on the use of money, coined money, and so speed up the effective velocity of coinage

iv) **Supply shocks**: effects of famine, war, war financing, etc; sudden increases in the supply of food, fuel, etc.

v) **Predictions about the future value of money**: i.e. a form of 'rational expectations:' if you believe that in the future money will lose its purchasing power, you will get rid of it, i.e. exchange it for assets of more stable value: and thus reduce cash balances and increase money velocity.

vi) **Interest rates and levels of national income**:

g) **<u>Keynesian Criticisms of the Quantity Theories of Money</u>**:

i) **While quantity theorists believe that k or V are stable,** at least in the short run, Keynes and his followers believe(d) that these variables are highly unstable and volatile.

(1) in particular, they argue that k and V are highly sensitive to interest rates in the short run, which in turn are functionally related to changes in the money supply. In short, Velocity varies inversely with the money supply and directly with interest rates; alternatively, that k varies directly with the money supply and inversely with interest rates. Remember that the interest rate represents the opportunity cost of holding cash balances.[1]

(2) Thus, in the short run at least, an increase in the money supply M should lower interest rates, which in turn should reduce Velocity (or permit a rise in k). Furthermore, a more plentiful money supply reduces the need to **economize** on the use of money, thus also reducing Velocity (or encouraging larger cash balances).

ii) **While quantity theorists have looked upon the aggregate money supply (continental or world -- depending on the era) as largely *exogenous,*** Keynesians have considered it to be largely **endogenous**, and a function of the real factors determining production and trade.

iii) **The classic Quantity Theory of Money, as noted earlier, assumed a normal or equilibrium state of Full Employment,** meaning that all resources would be fully employed, so that any increase in monetized spending would have to drive up prices proportionally, since any further increase in production and trade was impossible (in the short run).

iv) **Keynes, writing during the Great Depression years, argued that underemployment of**

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[1] See J. M. Keynes, *General Theory of Employment, Interest, and Money* (1936), p. 298: 'The primary effect of a change in the quantity of money on the quantity of effective demand is through its influence on the rate of interest.' And further, on p. 336: 'Now, if the wage-unit is somewhat stable..., if the state of liquidity-preference is somewhat stable..., and if banking conventions are also stable, the rate of interest will tend to be governed by the quantity of the precious metals, measured in terms of the wage-unit, available to satisfy the community's desire for liquidity.'

**resources was more often the normal state;** and that an increase in monetized spending would induce the productive employment of further resources, resulting in an increased output and trade that would counteract any potential inflation from that increased spending.

iv) **Keynes on longer-term inflation**:

In criticizing the classical Quantity Theory of Money, he stated: 'So far, we have been primarily concerned with the way in which changes in the quantity of money affect prices in the short period. But in the long run is there not some simpler relationship? This is a question for historical generalisation rather than for pure theory...' [*The General Theory of Employment, Interest, and Money* (1936), p. 306.]

v) **Observations**:

(1) Can we assume such perfect elasticity of response of V or k to changes in M and to changes in interest rates: Would an historian, usually studying somewhat 'longer runs' than those assumed by economists, believe that V or k would always change in exact proportion to changes in M, over long periods of time?

(2) We may deal with that question by assuming that, to the extent that changes in V or k are not exactly proportional to the changes in M, the difference is taken care of by increases in production and trade, i.e. by the changes in **y**. But again the historian may doubt that all the changes -- in M, V or k, and y -- are always so neatly counterbalancing, so that P (the price level) remains stable.

(3) We may agree that the money supply, especially for any given region or country, is far more endogenous than was assumed by the classical Quantity Theory; and that changes in real factors, changes in investment, production, and trade, may well induce necessary changes in the money supply, especially if the money supply is heavily based on credit instruments. But what about a pre-modern money supply that is far more based on precious metals? Are changes in the supply of precious metals and in mint outputs so fully endogenous in the Keynesian sense? Furthermore, what about coinage debasements: what determines them?

(4) In summary, supposing that the money supply was essentially endogenous, one may argue that the various economic processes increasing y (NNI) -- e.g. population growth, technological changes, investment, changing foreign trade patterns -- induced the requisite monetary expansion: in M, or in V, or in both together. If, however, inflation also occurred (a rise in P), historians must then explain why the evident monetary expansion was greater than the rise in real output and real incomes: why, with $\Delta P$, $\Delta(M.V) \rangle \Delta y$.

(5) The following section develops this theme; but to make the argument perfectly clear and to ensure a logical flow, many of the points made in this series of observations are necessarily repeated.

5. **Monetary and Real Factors in the Quantity Equations**

a) **If you look carefully at these equations,** you will see that they are not in fact purely monetary, but contain a *real* element, which is much more clearly seen in the modern versions: i.e. **y** for *real* NNI or NNP.

b) **Thus, in terms of M.V = P.y,** what will happen when you increase the stock of M, increase the Money Supply? Some combination of any or all of the three following might well happen:

i) Some increase in **y:** an increased quantity of M in circulation stimulates the economy and promotes increased production and trade, thus increasing incomes: thus producing a rise in NNP and NNI.

ii) Some reduction in **V:** since money is more plentiful, there is less need to economize on its use; its rate of circulation slows down; or some fraction of that increased M goes into hoards or larger cash balances. Furthermore, if an increased M results in lower interest rates, V should also fall for that reason (i.e. k would rise).

iii) Some increase in the Price Level **P**. But note carefully: to the extent that **y** rises, and to the extent that **V** falls, then the rise in the price level (**P**), the degree of inflation, will be proportionally much less than the increase in **M.**

- Conceivably, an increase in **M** could be totally offset by both a fall in V and an increase in y -- so that no inflation would result. Thus inflation is far from being an automatic result of increasing the money supply -- it is from being predictable; and thus price changes depend upon purely real as well as monetary factors.

- But we have reason historically to doubt that all these factors will so automatically and neatly counterbalance each other.

b) **Consider the older views on these issues of inflation**:

i) **Old-fashioned quantity theorists of 19th century,** and even Fisher, were looking essentially only at short term changes, and they assumed that any economy in 'equilibrium' must be operating at full employment, with no capacity for increased output, and with a constant money velocity.

- Thus, in their view, a 10% increase in **M** must produce a proportionate or 10% increase in **P,** the price level. Historically, however, that proves to be quite false: there is almost never any linear relationship between changes in money supplies and prices.

ii) **Keynes**: formulating his *General Theory of Employment* during the grim depression years of the 1930s, with mass unemployment.

- He assumed an economy with a large amount of unemployed resources, a highly elastic economy very responsive to changes in demand.

- He was also assuming that changes in **M** resulted endogenously from changes in investment

or government expenditure, increasing output, income, and aggregate demand.

- Such increases in an economy of unemployed resources would be reflected by a rise in real net national product and income (**Y)** without any inflation, at least until the point of Full Employment was reached.

- But, Keynes argued, once that point of full employment was reached, the traditional quantity theory would then finally apply: further increases in spending would be purely inflationary -- his concept of the 'inflationary gap'.

c) **The Phillips Curve:**

i) **Phillips:** a modern British economist (1958) who found a close correlation between changes in the price level and unemployment rates, from the 1860s to the 1950s:[2] the closer that an economy approached full employment, the higher or faster rose the price level; the higher the rate of unemployment, the more stable was the price level. This is not the either/or proposition of the traditional Keynesian backward L-shaped macro-diagram for Y = C + I + G + (X-M), but a relationship plotted along a rising or falling curve, demonstrating a trade-off between unemployment and inflation: the less of the one, the more of the other.

ii) **An inverted form of the actual Phillips curve,** in the form of an upward sloping aggregate supply curve, can best demonstrate this in terms of what we are talking about.

- Here full employment means not just full employment of the labour force, but full employment of all resources in the economy. We thus begin, as did Keynes, with an economy with considerable underemployment of resources -- at much less than FULL EMPLOYMENT.

- Thus, as aggregate demand rises, and as supply increases to meet that demand, resources in some sectors become more or less fully employed, producing some price increases in those sectors.

- That is, diminishing returns set in and supply becomes less and less elastic, less capable of expanding except at very high cost, thus producing price increases.

- But in other sectors, supply remains more flexible, more elastic, so that production can expand there without rising prices. As aggregate demand further increases, however, more and more sectors encounter these rigidities with rising costs, and a rising price level becomes more and more general.[3]

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[2] A. W. Phillips, 'The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861 - 1957,' *Economica*, 25 (1958), 283 - 299.

[3] In fairness to Keynes, he virtually said as much in his *General Theory of Employment, Interest, and Money* (1936), p. 300: 'It is probable that the general level of prices will not rise very much as output increases, so long as there are available efficient unemployed resources of every type. But as soon as output has increased sufficiently to begin to reach the `bottle necks', there is likely to be a sharp rise in the

- To repeat: the more fully employed resources become across all sectors and markets with rising aggregate demand, the greater proportionally will be the increase in the price level and the less proportionally will be the increase in real output. But it is difficult to envisage any economy, over time, which has no capacity for further output -- absolute full employment. There are always some technological and organizational changes possible to achieve some real gains.

iii) **To put this in terms of the modern quantity theory:**

- in so far as an increasing M or increasing V, or an increase in both variables, means an increased aggregate demand, we can expect to find some unpredictable combination of rising output and incomes on the one hand (i.e. increasing **y**);

- and then rising prices (**P)** on the other: and the closer the economy approaches full employment, the more increased spending will be inflationary.

- Conversely with heavy unemployment, in an economy with much of its resources lying idle, unutilized, an increasing **M** and rising aggregate demand will produce increased real output and incomes (in **y**), without any significant price increases.

- Thus the extent of inflation, or price increases, depends as much on these real factors as on the purely monetary factors.

iv) **Friedman and other 'monetarists':** have criticized the economic logic involved in the Phillips curve (concerning expectations of real vs. nominal or money incomes, etc.); and have offered a radically revised version. But time and space, and our mutual energies, do not permit an extended discussion of that debate here.

d) **<u>The effect of population growth may be twofold</u>**:

i) **on the supply side**: for **y**: population growth can lead to fuller or full employment of resources, diminishing returns, rising marginal costs across most sectors of the economy, in the absence of further technological changes (including changes in markets, financial instruments).

ii) **on the demand side**: for **M** and **V**: population growth will initially increase the demand for money (and will thus increase **k**), and thus reduce any inflationary impact from any increase in **M.** But population growth may also or subsequently change the structure and distribution of that population; and increased urbanization, and consequent changes in markets and financial structures, may lead to a reduced **k** -- or, to say the same thing, an increased **V**, an increased velocity of money circulation.

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prices of certain commodities.'

**Money Supply, GDP, and Prices in Canada, 1955 - 2008: Annual Means of monthly data**

| Year | M: MB<br>Money: Monetary Base in billions | V = Y/M<br>Income Velocity of M: Mon Base | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **1955** | 2.2588 | | | 16.83 | | | 15,681,250 | | 1.896 | |
| **1956** | 2.3793 | | | 17.07 | | | 16,070,250 | 1.39% | 3.153 | |
| **1957** | 2.4378 | | | 17.60 | | | 16,579,500 | 3.12% | 4.023 | |
| **1958** | 2.5973 | | | 18.04 | | | 17,062,250 | 2.51% | 2.499 | |
| **1959** | 2.7276 | | | 18.25 | | | 17,467,500 | 1.15% | 5.128 | |
| **1960** | 2.7500 | | | 18.48 | | | 17,855,250 | 1.23% | 3.539 | |
| **1961** | 2.8565 | 14.414 | 0.06938 | 18.70 | 220.176 | 41.1730 | 18,224,500 | 1.22% | 3.061 | 12,081.34 |
| **1962** | 3.0239 | 14.771 | 0.06770 | 18.87 | 236.740 | 44.6650 | 18,570,750 | 0.89% | 4.477 | 12,748.02 |
| **1963** | 3.1361 | 15.293 | 0.06539 | 19.22 | 249.561 | 47.9610 | 18,919,000 | 1.86% | 3.875 | 13,191.00 |
| **1964** | 3.3160 | 15.847 | 0.06310 | 19.57 | 268.564 | 52.5490 | 19,277,250 | 1.81% | 4.042 | 13,931.65 |
| **1965** | 3.5971 | 16.105 | 0.06209 | 20.03 | 289.288 | 57.9300 | 19,633,500 | 2.34% | 4.292 | 14,734.43 |
| **1966** | 3.8743 | 16.730 | 0.05977 | 20.78 | 311.875 | 64.8180 | 19,997,500 | 3.79% | 5.167 | 15,595.69 |
| **1967** | 4.1888 | 16.639 | 0.06010 | 21.53 | 323.675 | 69.6980 | 20,363,750 | 3.61% | 4.979 | 15,894.66 |
| **1968** | 4.2691 | 17.833 | 0.05608 | 22.39 | 339.997 | 76.1310 | 20,692,000 | 3.99% | 6.792 | 16,431.33 |
| **1969** | 4.7133 | 17.785 | 0.05623 | 23.43 | 357.717 | 83.8250 | 20,994,250 | 4.65% | 7.458 | 17,038.80 |
| **1970** | 4.9789 | 18.112 | 0.05521 | 24.21 | 372.512 | 90.1790 | 21,287,500 | 3.31% | 7.125 | 17,499.11 |
| **1971** | 5.5635 | 17.692 | 0.05652 | 24.87 | 395.827 | 98.4290 | 21,747,314 | 2.72% | 5.188 | 18,201.19 |
| **1972** | 6.3914 | 17.197 | 0.05815 | 26.08 | 421.392 | 109.9130 | 22,187,140 | 4.89% | 4.750 | 18,992.61 |
| **1973** | 7.3540 | 17.535 | 0.05703 | 28.06 | 459.600 | 128.9560 | 22,453,775 | 7.57% | 6.125 | 20,468.70 |
| **1974** | 8.3454 | 18.458 | 0.05418 | 31.13 | 494.769 | 154.0380 | 22,772,045 | 10.96% | 8.500 | 21,727.02 |
| **1975** | 9.7236 | 17.856 | 0.05600 | 34.46 | 503.858 | 173.6210 | 23,102,980 | 10.68% | 8.500 | 21,809.21 |
| **1976** | 10.9117 | 18.328 | 0.05456 | 37.06 | 539.673 | 199.9940 | 23,414,365 | 7.55% | 9.292 | 23,048.82 |
| **1977** | 12.0083 | 18.402 | 0.05434 | 40.03 | 552.087 | 220.9730 | 23,694,035 | 8.01% | 7.708 | 23,300.69 |
| **1978** | 13.4578 | 18.196 | 0.05496 | 43.61 | 561.537 | 244.8770 | 23,935,651 | 8.95% | 8.979 | 23,460.28 |

| Year | M: MB<br>Money: Monetary Base in billions | V = Y/M<br>Income Velocity of M: Mon Base | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **1979** | 14.8698 | 18.802 | 0.05319 | 47.59 | 587.449 | 279.5770 | 24,170,445 | 9.13% | 12.104 | 24,304.45 |
| **1980** | 16.0130 | 19.633 | 0.05093 | 52.43 | 599.695 | 314.3900 | 24,471,129 | 10.16% | 12.891 | 24,506.22 |
| **1981** | 17.1964 | 20.962 | 0.04771 | 58.94 | 611.572 | 360.4710 | 24,785,059 | 12.43% | 17.931 | 24,675.05 |
| **1982** | 17.4193 | 21.807 | 0.04586 | 65.31 | 581.639 | 379.8590 | 25,083,479 | 10.80% | 13.958 | 23,188.15 |
| **1983** | 17.7398 | 23.190 | 0.04312 | 69.13 | 595.062 | 411.3860 | 25,336,505 | 5.86% | 9.553 | 23,486.34 |
| **1984** | 17.9203 | 25.088 | 0.03986 | 72.11 | 623.481 | 449.5820 | 25,577,353 | 4.30% | 11.312 | 24,376.30 |
| **1985** | 18.7576 | 25.894 | 0.03862 | 74.97 | 647.907 | 485.7140 | 25,813,854 | 3.96% | 9.647 | 25,099.18 |
| **1986** | 19.9900 | 25.640 | 0.03900 | 78.10 | 656.262 | 512.5410 | 26,068,353 | 4.18% | 9.214 | 25,174.68 |
| **1987** | 21.0964 | 26.495 | 0.03774 | 81.49 | 685.897 | 558.9490 | 26,399,956 | 4.34% | 8.403 | 25,981.00 |
| **1988** | 22.2465 | 27.559 | 0.03629 | 84.79 | 723.059 | 613.0940 | 26,754,940 | 4.05% | 9.686 | 27,025.26 |
| **1989** | 23.5343 | 27.948 | 0.03578 | 89.03 | 738.813 | 657.7280 | 27,219,748 | 4.99% | 12.293 | 27,142.53 |
| **1990** | 24.4104 | 27.854 | 0.03590 | 93.27 | 729.008 | 679.9210 | 27,638,583 | 4.76% | 13.045 | 26,376.44 |
| **1991** | 25.3470 | 27.039 | 0.03698 | 98.51 | 695.745 | 685.3670 | 27,987,829 | 5.62% | 9.034 | 24,858.85 |
| **1992** | 26.7329 | 26.203 | 0.03816 | 99.98 | 700.655 | 700.4800 | 28,319,473 | 1.49% | 6.783 | 24,741.11 |
| **1993** | 28.2746 | 25.719 | 0.03888 | 101.83 | 714.092 | 727.1840 | 28,648,235 | 1.86% | 5.088 | 24,926.22 |
| **1994** | 29.2574 | 26.348 | 0.03795 | 102.00 | 755.758 | 770.8730 | 28,958,270 | 0.16% | 5.766 | 26,098.17 |
| **1995** | 29.5420 | 27.433 | 0.03645 | 104.21 | 777.698 | 810.4260 | 29,262,649 | 2.17% | 7.308 | 26,576.47 |
| **1996** | 30.1993 | 27.711 | 0.03609 | 105.85 | 790.613 | 836.8640 | 29,570,577 | 1.58% | 4.531 | 26,736.48 |
| **1997** | 31.7384 | 27.813 | 0.03595 | 107.57 | 820.638 | 882.7330 | 29,868,726 | 1.62% | 3.521 | 27,474.83 |
| **1998** | 33.5764 | 27.250 | 0.03670 | 108.63 | 842.258 | 914.9730 | 30,125,715 | 0.99% | 5.104 | 27,958.11 |
| **1999** | 36.5423 | 26.885 | 0.03720 | 110.52 | 888.953 | 982.4410 | 30,369,575 | 1.73% | 4.917 | 29,271.16 |
| **2000** | 38.1102 | 28.223 | 0.03543 | 113.53 | 947.357 | 1,075.5660 | 30,650,631 | 2.73% | 5.771 | 30,908.24 |
| **2001** | 39.6666 | 27.919 | 0.03582 | 116.41 | 951.357 | 1,107.4590 | 30,973,522 | 2.53% | 4.313 | 30,715.17 |

| Year | M: MB<br>Money: Monetary Base in billions | V = Y/M<br>Income Velocity of M: Mon Base | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **2002** | 42.3101 | 27.280 | 0.03666 | 119.03 | 969.716 | 1,154.2040 | 31,322,332 | 2.25% | 2.708 | 30,959.24 |
| **2003** | 43.9059 | 27.700 | 0.03610 | 122.32 | 994.297 | 1,216.1910 | 31,626,552 | 2.77% | 3.188 | 31,438.68 |
| **2004** | 45.2319 | 28.524 | 0.03506 | 124.56 | 1,035.808 | 1,290.1850 | 31,932,015 | 1.83% | 2.500 | 32,437.91 |
| **2005** | 47.3058 | 28.991 | 0.03449 | 127.34 | 1,076.965 | 1,371.4250 | 32,258,138 | 2.23% | 2.917 | 33,385.84 |
| **2006** | 49.6239 | 29.145 | 0.03431 | 129.90 | 1,113.400 | 1,446.3070 | 32,603,606 | 2.01% | 4.313 | 34,149.61 |
| **2007** | 52.1695 | 29.436 | 0.03397 | 131.65 | 1,166.461 | 1,535.6460 | 32,881,904 | 1.35% | 4.604 | 35,474.26 |
| **2008** | 54.4343 | 29.395 | 0.03402 | 135.78 | 1,178.445 | 1,600.0810 | 33,260,314 | 3.14% | 3.208 | 35,430.97 |

| **Money** | **Source** | **Definition** |
|---|---|---|
| Monetary Base | CANSIM | notes and coin in circulation, chartered bank and other Canadian Payments Association members' deposits with the Bank of Canada |
| M1 | IMF | notes, coins, chequable deposits: narrowly defined |
| M1B | CANSIM | currency outside banks, chartered bank chequable deposits, less inter-bank chequable deposits |
| M1+ Gross | IMF | M1 broadly defined: notes, coins, chequable and other deposits; Canada Savings Bond and other liquid assets |

**Money Supply, GDP, and Prices in Canada, 1955 - 2007: Annual Means of monthly data**

| Year | M1<br>Money: M1 narrrow in billions IMF data | V = Y/M<br>Income Velocity of M: M1 (MIF) | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y<br>Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **1955** | 4.7720 | | | 16.83 | | | 15,681,250 | | 1.896 | |
| **1956** | 4.7610 | | | 17.07 | | | 16,070,250 | 1.39% | 3.153 | |
| **1957** | 4.7880 | | | 17.60 | | | 16,579,500 | 3.12% | 4.023 | |
| **1958** | 5.4200 | | | 18.04 | | | 17,062,250 | 2.51% | 2.499 | |
| **1959** | 5.2330 | | | 18.25 | | | 17,467,500 | 1.15% | 5.128 | |
| **1960** | 5.4990 | | | 18.48 | | | 17,855,250 | 1.23% | 3.539 | |
| **1961** | 5.8510 | 7.037 | 0.14211 | 18.70 | 220.176 | 41.1730 | 18,224,500 | 1.22% | 3.061 | 12,081.34 |
| **1962** | 6.0770 | 7.350 | 0.13606 | 18.87 | 236.740 | 44.6650 | 18,570,750 | 0.89% | 4.477 | 12,748.02 |
| **1963** | 6.2960 | 7.618 | 0.13127 | 19.22 | 249.561 | 47.9610 | 18,919,000 | 1.86% | 3.875 | 13,191.00 |
| **1964** | 6.6930 | 7.851 | 0.12737 | 19.57 | 268.564 | 52.5490 | 19,277,250 | 1.81% | 4.042 | 13,931.65 |
| **1965** | 7.1300 | 8.125 | 0.12308 | 20.03 | 289.288 | 57.9300 | 19,633,500 | 2.34% | 4.292 | 14,734.43 |
| **1966** | 7.7180 | 8.398 | 0.11907 | 20.78 | 311.875 | 64.8180 | 19,997,500 | 3.79% | 5.167 | 15,595.69 |
| **1967** | 8.3550 | 8.342 | 0.11987 | 21.53 | 323.675 | 69.6980 | 20,363,750 | 3.61% | 4.979 | 15,894.66 |
| **1968** | 8.9070 | 8.547 | 0.11700 | 22.39 | 339.997 | 76.1310 | 20,692,000 | 3.99% | 6.792 | 16,431.33 |
| **1969** | 9.2410 | 9.071 | 0.11024 | 23.43 | 357.717 | 83.8250 | 20,994,250 | 4.65% | 7.458 | 17,038.80 |
| **1970** | 9.7620 | 9.238 | 0.10825 | 24.21 | 372.512 | 90.1790 | 21,287,500 | 3.31% | 7.125 | 17,499.11 |
| **1971** | 11.4840 | 8.571 | 0.11667 | 24.87 | 395.827 | 98.4290 | 21,747,314 | 2.72% | 5.188 | 18,201.19 |
| **1972** | 13.1660 | 8.348 | 0.11979 | 26.08 | 421.392 | 109.9130 | 22,187,140 | 4.89% | 4.750 | 18,992.61 |
| **1973** | 14.6350 | 8.811 | 0.11349 | 28.06 | 459.600 | 128.9560 | 22,453,775 | 7.57% | 6.125 | 20,468.70 |
| **1974** | 15.4930 | 9.942 | 0.10058 | 31.13 | 494.769 | 154.0380 | 22,772,045 | 10.96% | 8.500 | 21,727.02 |
| **1975** | 19.0380 | 9.120 | 0.10965 | 34.46 | 503.858 | 173.6210 | 23,102,980 | 10.68% | 8.500 | 21,809.21 |
| **1976** | 19.3950 | 10.312 | 0.09698 | 37.06 | 539.673 | 199.9940 | 23,414,365 | 7.55% | 9.292 | 23,048.82 |

| Year | M1<br>Money: M1 narrrow in billions IMF data | V = Y/M<br>Income Velocity of M: M1 (MIF) | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y<br>Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **1977** | 21.7090 | 10.179 | 0.09824 | 40.03 | 552.087 | 220.9730 | 23,694,035 | 8.01% | 7.708 | 23,300.69 |
| **1978** | 23.6170 | 10.369 | 0.09644 | 43.61 | 561.537 | 244.8770 | 23,935,651 | 8.95% | 8.979 | 23,460.28 |
| **1979** | 24.5860 | 11.371 | 0.08794 | 47.59 | 587.449 | 279.5770 | 24,170,445 | 9.13% | 12.104 | 24,304.45 |
| **1980** | 27.2790 | 11.525 | 0.08677 | 52.43 | 599.695 | 314.3900 | 24,471,129 | 10.16% | 12.891 | 24,506.22 |
| **1981** | 27.4590 | 13.128 | 0.07618 | 58.94 | 611.572 | 360.4710 | 24,785,059 | 12.43% | 17.931 | 24,675.05 |
| **1982** | 28.4780 | 13.339 | 0.07497 | 65.31 | 581.639 | 379.8590 | 25,083,479 | 10.80% | 13.958 | 23,188.15 |
| **1983** | 30.8670 | 13.328 | 0.07503 | 69.13 | 595.062 | 411.3860 | 25,336,505 | 5.86% | 9.553 | 23,486.34 |
| **1984** | 31.0720 | 14.469 | 0.06911 | 72.11 | 623.481 | 449.5820 | 25,577,353 | 4.30% | 11.312 | 24,376.30 |
| **1985** | 34.3750 | 14.130 | 0.07077 | 74.97 | 647.907 | 485.7140 | 25,813,854 | 3.96% | 9.647 | 25,099.18 |
| **1986** | 36.6630 | 13.980 | 0.07153 | 78.10 | 656.262 | 512.5410 | 26,068,353 | 4.18% | 9.214 | 25,174.68 |
| **1987** | 39.7930 | 14.046 | 0.07119 | 81.49 | 685.897 | 558.9490 | 26,399,956 | 4.34% | 8.403 | 25,981.00 |
| **1988** | 42.5870 | 14.396 | 0.06946 | 84.79 | 723.059 | 613.0940 | 26,754,940 | 4.05% | 9.686 | 27,025.26 |
| **1989** | 44.0600 | 14.928 | 0.06699 | 89.03 | 738.813 | 657.7280 | 27,219,748 | 4.99% | 12.293 | 27,142.53 |
| **1990** | 43.6960 | 15.560 | 0.06427 | 93.27 | 729.008 | 679.9210 | 27,638,583 | 4.76% | 13.045 | 26,376.44 |
| **1991** | 46.1710 | 14.844 | 0.06737 | 98.51 | 695.745 | 685.3670 | 27,987,829 | 5.62% | 9.034 | 24,858.85 |
| **1992** | 49.1970 | 14.238 | 0.07023 | 99.98 | 700.655 | 700.4800 | 28,319,473 | 1.49% | 6.783 | 24,741.11 |
| **1993** | 56.5290 | 12.864 | 0.07774 | 101.83 | 714.092 | 727.1840 | 28,648,235 | 1.86% | 5.088 | 24,926.22 |
| **1994** | 60.9850 | 12.640 | 0.07911 | 102.00 | 755.758 | 770.8730 | 28,958,270 | 0.16% | 5.766 | 26,098.17 |
| **1995** | 65.5270 | 12.368 | 0.08086 | 104.21 | 777.698 | 810.4260 | 29,262,649 | 2.17% | 7.308 | 26,576.47 |
| **1996** | 77.9190 | 10.740 | 0.09311 | 105.85 | 790.613 | 836.8640 | 29,570,577 | 1.58% | 4.531 | 26,736.48 |
| **1997** | 86.4950 | 10.206 | 0.09799 | 107.57 | 820.638 | 882.7330 | 29,868,726 | 1.62% | 3.521 | 27,474.83 |
| **1998** | 93.6230 | 9.773 | 0.10232 | 108.63 | 842.258 | 914.9730 | 30,125,715 | 0.99% | 5.104 | 27,958.11 |
| **1999** | 101.1830 | 9.710 | 0.10299 | 110.52 | 888.953 | 982.4410 | 30,369,575 | 1.73% | 4.917 | 29,271.16 |

| Year | M1<br>Money: M1 narrrow in billions IMF data | V = Y/M<br>Income Velocity of M: M1 (MIF) | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y<br>Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **2000** | 116.1030 | 9.264 | 0.10795 | 113.53 | 947.357 | 1,075.5660 | 30,650,631 | 2.73% | 5.771 | 30,908.24 |
| **2001** | 133.8580 | 8.273 | 0.12087 | 116.41 | 951.357 | 1,107.4590 | 30,973,522 | 2.53% | 4.313 | 30,715.17 |
| **2002** | 140.1970 | 8.233 | 0.12147 | 119.03 | 969.716 | 1,154.2040 | 31,322,332 | 2.25% | 2.708 | 30,959.24 |
| **2003** | 153.7390 | 7.911 | 0.12641 | 122.32 | 994.297 | 1,216.1910 | 31,626,552 | 2.77% | 3.188 | 31,438.68 |
| **2004** | 170.1790 | 7.581 | 0.13190 | 124.56 | 1,035.808 | 1,290.1850 | 31,932,015 | 1.83% | 2.500 | 32,437.91 |
| **2005** | 188.7220 | 7.267 | 0.13761 | 127.34 | 1,076.965 | 1,371.4250 | 32,258,138 | 2.23% | 2.917 | 33,385.84 |
| **2006** | 215.3450 | 6.716 | 0.14889 | 129.90 | 1,113.400 | 1,446.3070 | 32,603,606 | 2.01% | 4.313 | 34,149.61 |
| **2007** | 226.3917 | 6.783 | 0.14742 | 131.65 | 1,166.461 | 1,535.6460 | 32,881,904 | 1.35% | 4.604 | 35,474.26 |

| **Money** | **Source** | **Definition** |
|---|---|---|
| Monetary Base | CANSIM | notes and coin in circulation, chartered bank and other Canadian Payments Association members' deposits with the Bank of Canada |
| M1 | IMF | notes, coins, chequable deposits: narrowly defined |
| M1B | CANSIM | currency outside banks, chartered bank chequable deposits, less inter-bank chequable deposits |
| M1+ Gross | IMF | M1 broadly defined: notes, coins, chequable and other deposits; Canada Savings Bond and other liquid asset |

## III. GREAT BRITAIN AS THE UNCHALLENGED INDUSTRIAL POWER, 1815 - 1873

### A. Trends and Business Cycles in the British Economy, 1815 - 1873

1. **This is not a lecture topic**: and it is for independent reading only.

a) **However, I am posting on my Home Page, under Eco 303Y1 lectures, the printed version of a former lecture,** as Topic no. 11 (and so the this next topic, on Banking, is Lecture no. 12).

b) **For this and the subsequent topic on banking,** you might read Peter Mathias, *The First Industrial Nation* (2nd edn. London, 1983), chapters 7, 8, and 13.

c) **Please note, however, that I have some disagreements with him on British banking:** to be discussed below on the topic of banking (on central banking).[4]

d) **The logic of the lecture sequences:**

i) **with the previous lecture on the Industrial Revolution in cotton textiles**, we thus completed our historical and economic analyses of the Industrial Revolution period itself, arbitrarily defined as the period from about 1760 to the end of the Napoleonic Wars, in 1815.

ii) **You did see, however, that some fundamentally important innovations** in both the metallurgical and textile industries took place in the following decades: up to the 1840s

iii) **We are now going to focus on the major economic changes in the British economy from the 1820s, generally up to World War I:**

- in banking and finance,
- in transportation (the 2nd transportation revolution),
- in foreign trade — for the era of Free trade
- and, after our return in January, in Agriculture
- and finally the Steel Revolution, from the 1860s

iv) **We will, however, return to aspects of change in the British economy after 1870,**

(1) after we have examined the nature of the continental industrial revolutions: in France, Germany, and Russia, from 1815 to 1914

(2) Only after doing so, can we properly analyse how the British reacted to this new foreign competition, not only from continental Europe, but also from the U.S.

2. **Refer to hand-out for a schematic listing of the major economic trends and business cycles:** in the British economy, 1815 - 1914, along

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[4] See below p. 15; and note 2.

with the graph on price trends.

3. **Please refer as well to the document on the Quantity Theory of Money: from Fisher to Friedman** (complete with tables, etc.), which has also been posted on my Home Page (under 'Aids in Studying European Economic History), with this URL (in PDF format): http://www.economics.utoronto.ca/munro5/QUANTHR2.pdf

## B. Banking, Finance, and Commercial Organization

### 1. The Historical and Economic Significance of this Topic:

a) **first, we examine the very major changes in British banking and financial institutions:**
i) from the end of the Napoleonic Wars (1815) to the outbreak of World War I (1914).
ii) but some aspects of post-1870 banking will have to wait: until we have examined the radically different financial structures on the continent, at the end of this course
b) **second, we will see how the Bank of England became a genuine central bank:** and both its strengths and serious weaknesses in serving this new role (without any precedents to draw on).
c) **third, concerning this new 'central bank', we will examine the interventionist role of the government, in a supposedly laissez-fare free-market economy:** in particular how government economic policies were fashioned by faulty economic theory.
d) **fourth: we will examine the true foundations, formation, and functions of the modern business corporation:** the limited liability joint stock companies
e) **We need to understand all these issues involving financial institutions and the government:** in order to understand properly all the succeeding topics on the British economy between the Napoleonic War and First World War**;** i.e., in the full century, 1815 - 1914.

### 2. Weaknesses in English Banking Structure during Industrial Revolution and the Napoleonic Wars (i.e., from ca. 1760 to 1815)

a) **First Fault: Small size and inadequate capitalization of English banks**: no joint-stock financing permitted
i) **because, as we saw previously,**
(1) **the Bank of England held a monopoly on joint-stock banking** within England, dating from its Parliamentary foundation, in 1694;
(2) **Furthermore, the Bubble Act of 1720:** also made it virtually impossible – apart from the Bank of England's monopoly – to organize any joint stock companies, in banking, or elsewhere in the economy.
ii) **In general, English Common Law limited bank structures and capitalization, in these respects:**
(1) to just six-member partnerships, or family firms
(2) so that most English banks were too small and undercapitalized.
iii) **Unlike Scotland, England did not have any well developed system of branch banking,**
(1) very few English (or Welsh) banks had any branches;
(2) the Bank of England itself, as noted earlier, had only the one branch, in London: 'The Old Lady of Threadneedle Street', in the heart of the City.
iii) **Country Banks in England: i.e., banks outside of London**
(1) This problem of small bank size, without supporting branches,
- was especially true of those banks outside of London called country banks,

- almost all of which were created during the Industrial Revolution, to serve its needs
- in terms of both supplying the lubricant (paper money) and fuel (working capital) for the now expanding economic machinery of Industrial Revolution era England;

(2) the London banks (most of which had been the 'goldsmith' banks) were, in contrast, quite different: for they had grown slowly during the previous 150 years
(3) But these new country banks had no time to build up their capital bases, during the Industrial Revolution;
(4) around 1810 their capitalization was, on average, only a third of that enjoyed by the typical London bank (£10,000 vs. £30,000).
iv) **Thus, a proliferation of many small banks:** in 1825, England had 715 banks
v) **The question of bank reserves:**
(1) For a small bank to be reasonably secure, to protect itself against sudden withdrawals from deposits or sudden demands to exchange the bank's own banknotes for legal tender money (coin or B of E notes), it was supposed to maintain a cash reserve ratio of about one-third. [5]
(2) Reserves were rarely in gold or silver coin, but instead in

- Bank of England notes
- or else in the form of liquid assets, such as Consols (traded on the Stock Exchange)
- i.e., government stock, in the form of non-redeemable annuities, that could be easily sold at rediscount.

(3) To safeguard reserves, banks also preferred to make short-term or callable loans;
(4) and therefore they were very reluctant to issue long-term loans that could not be called or liquidated, when they needed to build up cash reserves.
(5) Essential problem was of course that too many banks were not prudent in managing their reserves;
(6) but even a good and prudent bank could be quickly ruined by a general financial panic.
vi) **Thus, to repeat: constant dangers of chronic bank failures, a form of 'Gresham's Law'**:[6]
(1) i.e., the danger that just one small and insolvent bank, which had lent too much to a few creditors or which had discounted too many bad notes, could cause a general panic.[7]
(2) and thus bring down all the good banks in the same districts: i.e., cause a 'run on the banks', so that (in the words of one student), 'they fell like

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[5] The Canadian government, or the Bank of Canada, abolished reserve requirements for Canadian chartered banks in 1991; and before that, they had already been very low – about 5%.

[6] Remember that Gresham's Law states that: 'cheap money drives out dear', or bad coins (counterfeit, underweight, inferior alloy, etc) drives out good, full-weight silver coins, if both have the same nominal face value, exchange value.

[7] As in the old saying: 'if you owe the bank £1000 you are in trouble; but if you owe the bank £1,000,00, the bank is in trouble'.

dominoes'.
(3) thereby draining them of all their cash reserves (which were always, of course, far less than total deposits).
(4) That disaster had in fact happened, as we saw before, in Lancashire in the 1770s, wiping out banks there for a generation, just when this region was undergoing the Industrial Revolution in cotton textiles.
vii) **Scotland, in contrast (as we have seen), had a far superior banking system:**
(1) Scotland admittedly had a few, but still relatively very few bank failures,
(2) and only one really serious bank failure: the Ayr Bank in 1772, which had no branches.
(3) With five large joint-stock banks by the 1820s,
- three as limited liability corporations,
- and no restrictions on the number of partners or bank size,
- Scotland consequently enjoyed a well-capitalized banking structure;

(4) and its particular advantage was a well developed system of branch banking, especially with the joint-stock banks. [i.e., fewer but much larger and more heavily capitalized banks.]
b) **Second fault**: **lack of any central control over note issue and credit**:
i) **Whether or not this was really a problem, the British felt that it was:**
(1) particularly during the Napoleonic Wars, when the government permitted an experiment in a purely 'paper pound':
(2) i.e., a purely fiduciary or fiat note issue, with no gold coverage, from the Bank Restriction Act of 1797 to 1821.
(3) In 1821, after a Parliamentary Royal Commission (the 'Bullion Report'), the Bank of England was required to resume full gold convertibility: i.e., the obligation to convert paper bank notes on demand into specifically defined, fixed quantities of gold (usually gold sovereigns).
ii) **The consequences of having had a purely fiduciary paper currency, during the so-called Bank Restriction era of 1797-1821:**
(1) there had been a flood of paper bank notes and drastic inflation : lasting at least until 1815, to the end of the Napoleonic Wars;
(2) and that inflation was blamed on the uncontrolled issue of paper banknotes and of bank credit. [see the accompanying graph]
c) **Attempts to solve both of these problems -- those involving bank size and note issue -- were the object of government legislation in two Bank Acts**:
i) **We will look separately at the bank acts of 1826 (amended 1833) and 1844.**
ii) **At the same time,** we are also considering the ancillary topic of the role of the state in the British economy.
iii) **As indicated earlier, this lecture topic may demonstrate as well the harmful consequences of state or government economic policies,** those based upon ill-advised economic theories.

## 3. <u>The Bank Act of 1826: Joint Stock Banking</u>

a) **The origin was a drastic commercial and financial crisis culminating in 1824-25**:

i) **That financial-economic crisis had begun with a crisis in commercial relations with Latin America, the former Spanish colonies there:**
(1) that commercial crisis, in turn, was the consequence of revolutions in Latin (Central and South) America against Spain:
- in the aftermath of the Napoleonic Wars and European continental chaos, to achieve independence, with their own post-colonial governments
- and with the establishment of very unstable governments, most were faced with internal rebellions.

(2) The commercial crisis soon became a general financial crisis in England that led to the collapse of 93 English and Welsh banks -- 13% of the total (of 715 banks).
(3) thus gravely aggravating (making worse) the existing financial and economic crisis.
ii) **Since no Scottish banks failed during this crisis,** there was obviously increased pressure within Parliament to change the law to allow English banks to follow the Scottish system.
iii) **While previous Parliamentary petitions had gone unheeded,** the government was now forced to pay much closer attention to recurrent petitions in Parliament on this very issue.
iv) **The End of the 'Bubble Restriction': Repeal of the Bubble Act in 1825**
(1) **In 1825, Parliament first responded by repealing the Bubble Act,** thus permitting the legal formation of joint-stock companies in general: with the right to have shares traded on the London Stock Exchange (LSE).
(2) **But, because of the Bank of England's long-standing monopoly on joint-stock banking (dating from its legislated foundation, in 1694),**
- banks, therefore, were initially excluded:
- thus requiring a separate act the following year.

b) **The Bank Act of 1826**: its chief provisions
i) **ended the Bank of England's monopoly on joint-stock banking: thereby permitting the establishment of joint-stock banks anywhere in England (outside London)**
(1) with an unlimited number of shareholders, as had always been case in Scotland.
(2) but London-based banks were initially excluded [see below: Bank Act of 1833]
ii) **Bank of England was ordered to establish branches for the first time outside of London,** in other English cities.
iii) **The note issue was restricted to just notes of £5 [= $25.00 U.S. dollars of the day] and above in denomination:** i.e., £1 notes, which were considered inflationary, were banned (except in Scotland).
c) **Two Exclusions from the 1826 Bank Act**:
i) **Exclusion of London banks:**
(1) The London banks were originally excluded, as just noted;
(2) but in the 1833 revision of this Bank Act, London banks were similarly allowed to organize as joint-stock companies, provided that they did not issue any banknotes.
ii) **Exclusion of limited liability privileges**:

(1) While the 1826 Bank Act did permit the formation of new joint-stock banks, nevertheless it still required that these banks operate under the legal provisions of partnership:

- i.e., that all the shareholders were still held accountable under law for all the debts of the firm (i.e., as though they were partners in the banks).
- Banks would not be allowed limited liability corporate status in fact until the later 1850s

(2) Again, the major change, with the General Limited Liability Law of 1856, excluded banks, which were granted this status only the following year, 1857;

(3) full limited liability for note issue was granted only in 1862.

d) **The Results: see chart and table on the screen**

**BANKING STRUCTURES IN ENGLAND & WALES AND THE UNITED KINGDOM**

**EW:** England and Wales
**UK:** United Kingdom (England, Wales, Scotland, and Ireland)
**PB:** private partnership banks
**JSB:** joint-stock banks

| Year | EW: Private Banks | EW: PB Offices/ Branches | EW: Joint-Stock Banks | EW: JSB Offices/ Branches | UK: Total Banks | UK: Total Offices/ Branches | UK: Average No. of Branches |
|---|---|---|---|---|---|---|---|
| **1850** | 327 | 518 | 99 | 576 | **459** | 1685 | 3.67 |
| **1875** | 236 | 595 | 122 | 1364 | **381** | 3320 | 8.71 |
| **1900** | 81 | 358 | 83 | 4212 | **184** | 6269 | 34.07 |
| **1913** | 29 | 147 | 41 | 6426 | **88** | 8610 | 97.84 |

**Sources:** Mae Baker and Michael Collins, 'English Industrial Distress Before 1914 and the Response of the Banks', *European Review of Economic History*, 3:1 (April 1999): 1-24; Mae Baker and Michael Collins, 'Financial Crises and Structural Change in English Commercial Bank Assets, 1860 - 1913', *Explorations in Economic History*, 36:4 (October 1999), 428-44.

i) **Over the next 25 years, 99 joint-stock banks were formed in England,**

(1) although many of the old London partnership banks retained this status,

(2) for they did not wish to lose control to other investors, with joint-stock financing.

ii) **By 1875,** that number had grown to 122 joint-stock banks

iii) **The larger joint-stock banks soon established branches,** along the Scottish model, in the major English cities.

iv) **The smaller joint-stock banks soon dwindled in number,** through business amalgamation:

(1) so that, by 1913 (on the eve of WWI), there were just 41 banks;

(2) of these, about a dozen were important;

(3) they have been now reduced to about five major banking corporations,

- of which HSBC: Hong Kong and Shanghai Banking Corporation (of British origin) is one of the most important,
- having absorbed one the largest of the older banking corporations, with many branches. the Midland Bank.[8]

[8] From Answers.com, concerning the Hong Kong and Shanghai Banking Corporation: 'Known locally by the affectionate term 'Hankers and Shankers', or equally its old trademark HongkongBank, the bank was founded by the Scot Thomas Sutherland to finance trade in the Far East in 1865. It is the largest bank in Hong Kong, with branches in major cities in mainland China. In March 1865 the Hongkong and Shanghai Banking Corporation Limited was established in Hong Kong to finance the growing trade between China and Europe, with an office opened in

v) **As you can see from the table,**

(1) the decline in the number of the major banks was also accompanied by a significant growth in branch banking,

(2) so that the average number of branches per bank in the UK rose from 3.7 in 1850 to 97.8 in 1913.

vi) **The five biggest were obviously London-based:** with their branch-banking systems, they controlled about two-thirds of national banking assets, in 1913-14.

vii) **As a result the efficiency and competitive of English banking greatly improved:**

(1) there was indeed a sharp drop in bank failures in England,

(2) though certainly some bank failures, even of joint-stock banks, did occur later in the 19th century.

viii) **Even so,** there still remained another 29 independent private-partnership banks.

ix) **most of these would disappear in the course of the 20th century:**

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Shanghai during April of that year. The bank was incorporated in Hong Kong by special dispensation from the British Treasury in 1866, and under the Hongkong and Shanghai Bank Ordinance 1866, a new branch in Japan was also established. The bank handled the first public loan in China in 1874, thereafter issuing most public loans..... In anticipation of the Japanese invasion of Hong Kong in 1941, the bank's head office moved to London. In 1980, the bank, now under the chairmanship of Michael Sandberg acquired a 51 per cent stake in Marine Midland Bank, of the United States of America, and continued its expansion with the establishment of The Hongkong Bank of Australia Limited in 1986. 1987, under the Chairmanship of Willie Purves, saw the bank's ownership of Marine Midland Bank increased to 100% and the acquisition of a 14.9% share in Midland Bank in the United Kingdom. In 1991 HSBC Holdings plc was established to act as a parent company to the group; shares are currently traded on the London and Hong Kong stock exchanges. Under the HSBC brand, the bank maintains a network of around 220 branches throughout the Hong Kong SAR, from which it offers a wide range of financial products and services. For some time in the late 1980s and early 1990s, the bank was known by the name HongkongBank in its native city, although its stock now trades as HSBC.

e) **Their 19th-Century Banking Functions: Short Term Financing**

i) **despite the very large growth in average size and capitalization,** despite much greater security:

(1) British banks by and large (including the Scottish) continued to restrict their activities chiefly to discounting and short-term lending ( 90-day notes),

(2) There are, to be sure, several examples of longer-term lending by British banks;

(3) but that is the exception to the general rule of short-term lending

iii) **As we shall see, this was in sharp contrast to so much continental banking that developed in the 19th century:** which we call 'investment banking'.

(1) it focused instead much more directly on long-term lending and financing fixed-capital formation.

(2) But such banking was also combined with normal commercial banking.

iv) **the 'Real Bills' Doctrine:** refer to the earlier lecture on 18th-century English banking [repeated as an appendix to this lecture].

v) **Tradition is not the only reason, however, to explain the peculiarity of British banking**:

(1) the real reason probably lay in the prior development of alternative institutions for financing fixed capital formation, especially joint-stock financing (after 1825).

(2) so far, however, economic historians have been unable to demonstrate the role that such institutions as mortgage companies, insurance companies, and building societies played in industrial financing during the 19th century.

vi) **British joint-stock and investment banking after 1870:**

(1) We shall return to this question of banks and industrial financing in the final section of the course, on the British economy from 1870 to 1914: to examine the British response to continental industrialization and to continental investment banking.

(2) We will then find more examples of long-term industrial financing by banks,

(3) but chiefly by what are called ‘merchant banks’ -- many of them German/Dutch and American in ownership or origin -- rather than by British-based joint-stock banks;

(4) and even these merchant-banks (such as the Baring Brothers) did not engage in that much industrial financing before the 20th century [to be seen next term]

f) **The Growth of Bill Brokers and the London Discount Market**:

i) **During the Napoleonic Wars, a new financial institution emerged:** bill brokers, evolving into what are called ‘discount houses.’

(1) They began as financial intermediaries, as agents or brokers for various country banks,

- bringing together those who wished to buy and those who wished to sell commercial paper:
- i.e., they took surplus funds from various country banks to buy commercial paper at discount;

(2) more often they bought paper at rediscount, thus providing ready cash for those banks who sold such bills, and a source of income for those buying or discounting bills.

ii) **Other country banks, not wishing to deal with these new bill brokers,** had simply deposited their surplus funds with London banks, to earn interest on these deposits;

iii) **but after the 1825 financial crisis,** many London banks ceased paying interest on these deposits.

iv) **In response, the London bill-brokers then agreed to accept such deposits from country banks:**

(1) as 'call loans' (paying interest, callable on demand);

(2) and then used those funds to invest in the discount market (i.e., to buy commercial paper).

v) **In 1830, the Bank of England:**

(1) permitted the London bill brokers or 'discount houses' to rediscount commercial paper at the offices of the Bank of England;

(2) Consequently, by and large, the commercial banks then bypassed the Bank of England by rediscounting directly with the London discount houses: with a significant reduction in their transaction costs.

vi) **Thus the discount houses became intermediaries between the regular commercial banks and the Bank of England.**

(1) Not just country banks but also London banks and the new joint-stock banks also deposited their surplus funds as 'call loans' with the London discount houses;

(2) They effectively dominated this business until the financial crisis of the 1890s.

## 4. The Bank Charter Act of 1844

a) **This bank act, part of the decennial revision of the Bank of England act,** followed upon the very serious economic crisis of 1836-1842.

b) **It is the most significant piece of monetary legislation in 19th century Britain, establishing the legal powers of the Bank of England to World**

**War I (to 1914)**:

i) **The act marked the beginning of some central-banking functions of the Bank of England:** in trying to regulate the domestic money supply.

ii) **In some respects it also marks the formal beginning of Gold Standard in Great Britain:** i.e.,

(1) in making the currency and gold freely convertible into each other at a fixed exchange rate;

(2) and similarly freely convertible into other gold-backed currencies.

iii) **But the provisions of this act, and of the Gold Standard principles,**

(1) also impeded the full development of central banking in Britain

(2) by the naive belief that the money market would be self-regulating if only left alone, by the principles of 'laissez-faire'.

iv) **Nevertheless, even in a basically laissez-faire economy like that of 19th century Britain,** the state still played an important role, as the history of this act demonstrates.

v) **Even more important is the role played by economic theorists,** and by contemporary fashions in economic theory.

c) **The Bank Charter Act**:

i) **was based on the views of a group of contemporary monetary theorists known as the Currency School,** which had won currency so to speak within the British government and the Bank of England (prevailing over the Banking School).

ii) **A strict and crude quantity theory of money was foundation of their beliefs**:

(1) The modern version is known as the Equation of Exchange or the Fisher Identity: $M.V \equiv P.T$: i.e., the stock of money (M) times the rate of its flow

(V for Velocity) must equal the value of the total volume of transactions times the price level or consumer price index (p).

(2) which is now better expressed as $M.V \equiv P.y$: in which y = real NNI, which can be readily measured, with national income statistics, while T (volume of transactions) cannot be.

(3) Better yet is the Cambridge Cash Balances equation: $M = k.P.y$, in which the variable 'k' represents that proportion of the Net National Income (P.y) that the public collectively chooses to hold in real cash balances:

(4) The reasons for holding cash balances are explained by the Keynesian concept of Liquidity Preference (i.e., factors determining demand for money).

- transactions motives: need for cash for day to day purchases
- precautionary motives: emergency reserve fund
- speculative and investment motives: to take advantage of new investment opportunities.

(5) Note that there is an opportunity cost in holding such cash balances:

- the cost is foregoing the income (interest, dividends, rent) to be earned by investing those funds rather than holding cash balances
- the market rate of interest will therefore influence how much or how little the public will hold in cash balances: i.e., holding less when interest rates are high

(6) Note the similarities in the two equations:[9]

- both equations are pure tautologies: total spending = total spending
- both are linked by the fact that the variables are reciprocals of each other:

**k** = 1/V; **V** = 1/k

[see table at end of lecture]

(7) In accordance with the even cruder version fashionable amongst nineteenth-century Classical Economists, this group believed that the quantity of money solely, directly, and automatically determined the level of prices, interest rates, and foreign exchange rates:

(8) For the determination of the price level, most economists then wrongly assumed that:

- an increase in the money supply of, say 10%, would automatically lead to a proportional and thus 10% increase in the price level;
- and conversely that a 10% reduction in the money supply would lead to a 10% decline in the price level.

(9) For foreign trade that also meant that:

- a 10% rise in prices would lead to a corresponding fall in exports and rise in imports
- conversely a 10% fall in prices would lead to a corresponding rise in exports and fall in imports
- correspondingly also such a rise in prices would also lead to an outflow of gold and a trade deficit , while a fall in prices would lead to an

[9] Again see: http://www.economics.utoronto.ca/munro5/QUANTHR2.pdf

influx of gold and a trade surplus

(10) For some, that determination was general and eventual, rather than automatic and immediate.

iii) **They assumed perfect convertibility between paper money and gold**: and argued that all paper banknotes were or should be substitutes for gold.

iv) **They therefore advocated the establishment of a pure gold currency to prevent all future economic crises**: i.e., a system in which all bank notes would be backed 100% by gold bullion in the vaults of the Bank of England.

v) **They argued that the following would result, according to the classic Price-Specie Flow Mechanism,** first enunciated by David Hume (1711 - 1776) and accepted as an axiom in economic theory by the 19th-century Classical School: [see the lecture on Trade: Mercantilism, topic no. 4]

(1) A trade deficit would lead to an outflow of bullion, as just explained;

(2) and that bullion outflow in turn would contract the money supply, as merchants used their paper bank notes to buy bullion to be sent abroad to finance the trade deficit.

(3) The Bank of England in selling gold would neutralize or destroy the paper money received from the merchants.

(4) As the money supply contracted with the bullion outflow, the resulting deflation (automatic and proportional, according to this theorem) would lower prices,

(5) thus making exports cheaper, and so causing exports to expand;

(6) Conversely, imports would become relatively more expensive and so imports would contract;

(7) and thus with expanding exports and contracting imports, trade would again be restored to equilibrium, halting the bullion outflow.

v) **The central thesis of the Currency School was that the quantity of paper bank notes in circulation must always equal the bullion supply, i.e., the gold bullion reserves of the Bank of England**.

(1) Any increase or decrease in the paper money supply had to be, and necessarily only be, the automatic consequence of a corresponding increase or decrease in the Bank of England's gold reserves.

(2) No other bank notes could be issued (or withdrawn).

(3) Thus the Bank would issue bank notes in buying bullion from merchants;

(4) and would withdraw bank notes received from merchants who bought bullion from the Bank.

d) **Provisions of the Bank Charter Act of 1844**: now better known as Peel's Act, after the Prime Minister who introduced it (Robert Peel): important both

- for explaining the subsequent history of the Bank of England, until World War I (1914)
- but also for illustrating how bad economic theory can influence the development of institutions and of economic history itself, with harmful results

i) **The Bank of England was to be split into two autonomous departments**:

(1) **The Issue Department**: to be solely concerned with the money supply.

- to be kept completely separate from the rest of the Bank of England
- in order to ensure the automatic regulation of the bank note issue.

(2) **The Banking Department**:

- to be solely concerned with normal commercial banking functions,
- especially lending and discounting.

ii) **The note issue of the Bank of England**:

(1) was to be limited to the amount of its gold bullion reserves plus the bank's current capital stock of £14 million.

(2) This was a slight deviation from the principles of the Currency School, in permitting some fiduciary currency, though backed by real assets, if not gold bullion.

iii) **Any subsequent note issues had to be fully, 100% backed by gold bullion**:

(1) i.e., notes could be issued only in exchange for bullion.

(2) And conversely, if the bank sold bullion, it had to destroy the banknotes received for that bullion.

iv) **The banknote issues of the private commercial banks in England**: were to be gradually taken over by the Bank of England.

(1) Existing banks were limited to the average of the previous year's circulation of banknotes: i.e., they could never issue more than that previous year's issue.

(2) existing bank note issues were to be taken over gradually by the Bank of England.

- If any private bank for any reason discontinued issuing notes, the Bank of England would replace them with its own notes up to 2/3 of the discontinued issue

- while the other third was viewed as part of reserves.

(3) No new banks were allowed to issue bank notes in Great Britain.

(4) Existing Scottish banks were permitted to operate their note issues independently of the Bank Charter Act (and some still issue notes today: e.g., the Royal Bank of Scotland).

v) **Scotland and the Bank Charter Act**

(1) By the following year's Bank Act of 1845, most of these provisions, *other than those on banknotes,* were extended to Scotland;

(2) that effectively amalgamated the English and Scottish banking systems (though not the money supply).

e) **The British Money Supply: Theoretical Faults of Peel's Act:**

i) **Faults of the Currency School's monetary thesis**: in being based on what is clearly a very crude and unrealistic (totally unhistorical) Quantity Theory of Money:

(1) the Currency School overlooked the effect of changes in these variables: in affecting the price level and foreign exchanges, i.e.,

- Velocity (**V) –** the income velocity of money; or Cash Balances (**k)**
- and Transactions (**T),** or better, independent changes in real national product (**y)**
- the assumption that these variables V (or K) and T (or y) are fixed in the short run is false.
- See the table on Canadian money supplies, GDP, interest rates, and price levels, in appendix

(2) its proponents overlooked the fact that paper credit in the form of bank cheques (current-account deposits), bills of exchange, promissory notes, etc.

all functioned as money;

(3) indeed they were already becoming more important than coin and banknotes in determining composition and volume of the money supply.

(4) This obvious fact was continually pointed out by the opponents of the Currency School, known as the Banking School.

(5) As we shall see later from statistical evidence, there was in fact no linear relationship between gold stocks and the supply of credit and thus of money stocks broadly defined.

ii) **The Monetary Approach to the Balance of Payments: an alternative modern monetary theory, developed in the 1970s by Harry Johnson,** which contradicts or is opposed to the classic Price-Specie Flow mechanism. Its basic tenets are as follows:[10]

(1) **World gold stocks determine a world price level:** under a gold standard, with currencies freely convertible into gold.

(2) **By the international 'law of one price',** world prices and price changes anywhere are quickly transmitted to all countries via commodity and

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[10] See the following publications: and note that Harry Johnson (1923 - 1977) graduated from the University of Toronto in 1943 and subsequently taught here (in what was then the Department of Political Economy), before going to Manchester, London, and then Chicago (in 1959).

(1) Jacob A. Frenkel and Harry G. Johnson, eds., *The Monetary Approach to the Balance of Payments* (Toronto: University of Toronto Press, 1976):

a) Jacob Frenkel and Harry Johnson, 'The Monetary Approach to the Balance of Payments: Essential Concepts and Historical Origins', pp. 21-45.
b) Harry Johnson, 'Towards a General Theory of the Balance of Payments', pp. 46-63.
c) Harry Johnson, 'The Monetary Approach to Balance-of-Payments Theory', pp. 147-67.
d) Harry Johnson, 'The Monetary Theory of Balance-of-Payments Policies', pp. 262-86.
e) Donald N. McCloskey and J. Richard Zecher, 'How the Gold Standard Worked, 1880-1913', pp. 357-85.

(2) John E. Floyd, *World Monetary Equilibrium: International Monetary Theory in an Historical-Institutional Context* (University of Pennsylvania Press, 1985), especially chapters 4 and 5.

capital markets -- indeed by arbitrage traders -- **and without necessarily requiring any corresponding gold flows**.

(3) **On the assumption that domestic money supplies are essentially endogenous,** the combination of the changed national price level and domestic **real** incomes and **real** balances will then determine the requisite money supply to meet these needs in equilibrium.

(4) **By this theory, therefore, while world gold stocks determine the world price level,** world prices determine national prices which in turn (with real incomes) determine domestic money stocks.

(5) **So crudely stated, this theory also assumes an unhistorical stability in both V and y:**

- i.e., it neglects to consider autonomous changes in **Velocity** (V),
- i.e., changes in the demand for real balances (k = 1/V), changes in credit institutions, in productivity, real incomes, etc. and other factors constituting **y**.

f) **The Actual Consequences of the Bank Charter Act**:

i) **Had the Currency School and the legislators been correct in their monetary theory in framing this act,**

(1) we would expect, as the first consequence, that the domestic banknote supply would have become far too inelastic for a rapidly expanding industrial state:

(2) i.e., as inelastic as the gold bullion supply.

ii) **Fortunately for Britain and the expanding world economy this did not happen for three very important reasons**:

(1) Peel's Act unintentionally encouraged a significant expansion in other forms of money,

- i.e., credit instruments, especially bank cheques,
- which became far more important than coins and notes (and which also displaced the old traditional inland bills).
- The credit supply, now divorced from real money, was largely independent of the Bank of England's gold reserves.
- That therefore meant that the Bank Act was of really very limited importance in influencing the money supply.

(2) Secondly, the obvious related factor: a rise in the income velocity of money (or in Cambridge 'cash balances' k) could compensate for any rigidities in the money supply.

(3) Thirdly, from this very era, in the 1850s, there occurred two major gold mining booms: in both California and Australia, greatly augmenting the world's gold supply (much of which flowed to Great Britain): see the graphs.

g) **The Evolution of Central Banking**: Further Negative Consequences of the Bank Charter Act:

i) **While there is still some disagreement on this issue,** the majority of financial historians now argue that the Bank Charter Act (Peel's Act) seriously impeded the development of modern Central Banking in Britain.[11]

ii) **Bank of England's Role as a central banker or 'Lender of Last Resort':**

(1) Prior to the Bank Charter Act, and certainly from the 1797 crisis, the Bank of England had been developing these rudimentary central-banking

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[11] Peter Mathias, *The First Industrial Nation* (2nd edn. 1983), chapters 7, 8, and 13. I had voiced some of my disagreements with some of his views, in his presence, at an international conference on European banking held in Siena, Italy, in 1989; and found more support for my views than for his. See also Rondo Cameron, ed., *Banking in the Early Stages of Industrialization: A Study in Comparative Economic History* (New York, 1967).

functions in managing the supply of currency and credit, especially through the rediscount rate.

(2) There had been general acceptance of the view that the Bank's fundamental role was to act as a ‘Lender of Last Resort’.

iii) **The framers of Peel's Act, however, fully believed that the newly established Banking Department should:**

(1) be relieved of any such role and

(2) should instead restrict itself to the operations of a normal commercial bank: operating in competition with the other private banks in the London money market,

(3) Thus the Bank was supposed to follow market discount or interest rates, rather than trying to control or set them.

iv) **Peel's government and many directors of the Bank believed that,**

(1) so long as the bank and the economy were allowed to function unfettered according to the hallowed principles of Classical Economics, financial and economic crises would be impossible:

(2) that a fully gold-backed currency would ensure a stable and automatic equilibrium of the economy.

v) **They really believed that any changes in the balance of trade, and hence in Britain's gold bullion supply,** i.e., in the Bank of England's gold reserves, would therefore automatically adjust the level of prices, interest rates, and the balance of trade.

vi) **Indeed the Banking department then did plunge into the London money market in the mid 1840s:**

(1) to attract business, it cut its discount rate at times below the market rate, to as low as 2.5%.

(2) Many people now blame the Bank's activities for causing a speculative credit boom that burst in a severe financial crisis in 1847 (which also had

other causes).

vii) **Subsequent financial crises indeed proved the folly of this policy.**

g) **The Financial and Economic Crisis of 1847**

i) **What happened in the first great crisis of 1847 was this, initially**:

(1) A catastrophic harvest failure (to be investigated in two more topics) in northern Europe, combined with the disastrous Potato Famine in Ireland, required very substantial imports of grains and other foodstuffs to deal with this crisis.

(2) Those grain imports led to a short-run trade deficit (Current Account): which had to be financed by a large outflow of gold.

(3) By the provisions of the 1844 Bank Charter Act purchases of gold from the Bank of England reserves necessitated a destruction of the currency used to purchase the gold.

( 4) Therefore, bank reserves in the private sector contracted as clients used B of E notes from the reserves to have their financial agents buy gold to pay for grain imports

(5) That in turn led to a contraction of the aggregate money supply

ii) **expected consequences by the framers of the Bank Charter Act:** those adhering to the crude Quantity Theory of Money and contemporary Classical Economics

(1) the contraction of the money supply should have resulted in an immediate fall in prices

(2) thus export prices should have fallen – to stimulate exports

(3) imports should have been curbed: because imports would have become *relatively* more expensive

(4) therefore, as exports rose and imports fell, the bullion outflow should have been reversed or counterbalanced by a bullion influx.

(5) The supposed influx of bullion should resulted in an increase in the money supply, and thus a rise or restoration of the price level: back to equilibrium.

iii) **what actually happened threatened economic disaster:**

(1) prices did not in fact fall,

- for there were too many cost and price rigidities: most factor costs could not adjust in the short run
- therefore, exports did not rise nor were imports curbed:
- more gold continued to flow out of the country

(2) Thus, if prices do not adjust with monetary contraction, then the economy must adjust by other forms of very dangerous contraction: with a liquidity crisis.

(3) the monetary contraction led to a severe contraction of bank reserves, thus limiting the ability of banks and other financial institutions to lend money, to provide credit.

(4) thus the liquidity crisis: and without easy access to credit, at previously prevailing low interest rates, many businesses were threatened with bankruptcies.

iv) **the responses of the British government and the Bank of England:**

(1) fortunately, the Chancellor of the Exchequer (the finance minister) and his financial officials soon realized the nature of the impending economic disaster.

(2) Privately they instructed the Bank of England to ignore the provisions of the Bank Charter Act and to do the exact opposite of the what the regulations stated were to be followed.

- and thus to rediscount freely,
- in order to supply the discount houses and banks with sufficient credit and banknotes for their own reserves.
- in fact the Bank was told to resume its former role of Lender of Last Resort

(3) The clear lesson was this: when commercial and trade crises lead to a liquidity crisis, the only feasible and immediate response must be to restore liquidity: by lending freely and by reflating the money supply.

(4) We shall come back to this economic crisis in the last lecture for this term (next week), when we discuss the introduction of Free Trade, by Peel's government: introduced chiefly because of this economic crisis.

b) **The subsequent financial crises of 1856-57, 1866, and 1873:**

i) **The same consequences and reactions can be seen in three following crises: 1856-57, 1866, 1873);**

(1) Each time, the British government had to instruct the Bank of England to suspend the requisite provisions of the Bank Charter Act

(3) Thus there ensued considerable dissension within the Bank about its proper role.

(4) Certainly many in the Bank were still unwilling to establish clearly any role as Lender of Last Resort, i.e., freely lending or rediscounting in times of

crisis.

(5) Many within the Bank felt that its first obligation lay with its stockholders;

(6) and thus that it should maximize profits in the London money market.

ii) **The verdicts of two hostile economic historians:** you can judge for yourself whether or not they are fully justified in the following harsh criticisms.

(1) Jacob Viner: 'The available evidence warrants the verdict that during the period from about 1800 to about 1860 the Bank of England almost continuously displayed an inexcusable degree of incompetence or unwillingness to fulfill the requirements which could reasonably be expected of a central bank'.[12]

(2) Rondo Cameron: 'At almost every point at which banking and monetary policy might have been used constructively to promote economic growth, the authorities either made the wrong decision or took no action at all'.[13]

iii) **After the 1873 crisis, a very major international crisis**, the Bank's philosophy changed, as the following notes explain.

## 5. The Bank of England's Subsequent Evolution as a Central Bank

a) **Those financial crises**: intensified by the Bank's failure to act until it was almost much too late, obviously undermined any remaining faith in the

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[12] Jacob Viner, *Studies in the Theory of International Trade* (New York, 1937).

[13] Rondo Cameron, ed., *Banking in the Early Stages of Industrialization: A Study in Comparative Economic History* (New York, 1967).

currency principles of the Bank Charter Act:

b) **certainly by the financial crisis of 1873,** an international financial crisis of large proportions, there developed an implicit agreement to change policies.

i) **In that same year, the economist Walter Bagehot published his most influential book,** *Lombard Street*, arguing that the fundamental duty of the Bank of England was to act as Lender of Last Resort;[14]

ii) **he recommended that the Bank should always offer freely to rediscount,** buying any and all good commercial paper, i.e., promissory notes, and other credit instruments, presented to it (and reselling some if necessary).

c) **During the 1870s the Bank directors evidently came to accept that principle,** though still unwilling to initiate any formal amendment of the Bank Charter Act, which remained in force until 1914.

d) **But in 1878, the Bank did announce that it would rediscount paper at market rates only for a few select customers;** and for all others, rediscounting would be at Bank Rates that would normally be set above the current market rates.

e) **Did the Bank of England then become a Central Bank?**

i) **Certainly the Bank of England had firmly cemented its role as Lender of Last Resort,** and so restored confidence.

ii) **Some historians go further:**

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[14] Walter Bagehot (1826-1877), *Lombard Street; a description of the money market* [London, 1873] *With a new introduction*, by Frank C. Genovese (Homewood, Ill., R.D. Irwin, 1962).

(1) to argue that the Bank of England withdrew slowly from active participation in the London money market,

(2) and that the Bank of England used its Bank Rate to influence the money market and thereby the overall economy.

iii) **But in fact the Bank still operated as a private bank and still invested heavily in various commercial assets (and did so until 1945: when nationalized by the new Labour government)**:

iv) **and thus really continued with older policy:** of necessarily following the market rather than directing it.

v) **Nor is there any evidence that the Bank of England followed any aggressive policy of trying to manage the national money supply and credit by autonomous use of Bank Rate**: i.e., to force adjustments in the market rate of interest.

(1) Nor did it engage in any important Open Market operations to expand or contract the money supply: i.e.,

- by purchasing government bonds from the public: exchanging bonds (acquired by the bank) for money, thus expanding the effective money supply.
- by selling government bonds to the public: and thus acquiring in return cash, which could be neutralized, thus contracting the effective money supply.

(2) But given the relatively small size of the national debt and especially that held in bonds, there was not much room to manoeuvre in terms of such open market operations

(3) Much of the national debt was still held in the form of Consols [Consolidated Stock of the Nation] as perpetual annuities, from Pelham's Conversion of 1749-53 (finishing in 1757).

- which the government was loath to redeem
- as noted earlier, the government did not do so until 1888: when it replaced the original 3.0% Consols with new, lower-interest rate annuities return: at 2.75%, which became 2.5% Consols in 1903: the same rate applying to this very day)
- and which the government would and could not readily augment with new issues

v) **Nor, finally, does it appear that the Bank of England successfully managed the next two financial crises**: of 1890 (crisis involving the Baring Brothers bank) and 1907.

vi) **We really have to wait until the 20th century,** after World War I, and perhaps to the 1930s, to witness the real evolution of Central Banking.

f) **Conclusion:**

i) **Whatever the remaining faults of the British banking structure, the fact remained that British banks,** along with the Bank of England, dominated the world's financial markets from the 1860s to World War I;

ii) **and in so doing,** the Bank of England constituted one of the chief and most profitable pillars of the British economy in this era (when the British economy was supposedly declining).

## 6. Joint Stock Company Organization and Corporate Status

a) **Repeal of the Bubble Act in 1825**: the first major change

i) **The 1720 Bubble Act, as we have seen,** had prohibited all new joint-stock companies

(1) unless they were specifically authorized and incorporated by Parliament: by private Acts of Parliament,

(2) which were very rarely granted, and extremely costly to obtain.

(3) The only major and indeed necessary exceptions were, as noted several times previously, the canal companies in the 1790s:

- for reasons noted earlier: including the salient fact that canal companies were established only by private Acts of Parliament, which granted them monopoly rights
- so that adding an incorporation clauses was not a major extra cost.

ii) **Otherwise all business ventures were limited by law to the status of six-member partnerships.**

iii) **That restriction was obviously not so great as to prevent the Industrial Revolution:** we saw that much of the fixed capital requirements, which were then generally modest, were financed by profit reinvestment by the firms themselves.

iv) **But by the early 19th century, the restrictions of the Bubble Act were beginning to become more of a burden:**

(1) partnerships and other forms of business organization were proving to be inadequate in raising the much larger amounts of fixed capital required with a more advanced industrial technology and increased scale of production.

(2) So pressure mounted for repeal of the Bubble Act.

v) **The commercial-financial crisis of 1824-25 provided the catalyst,** as we have seen, in having Parliament repeal the Bubble Act in 1825.

b) **Defects of the Repeal Legislation**: to explain why so few joint-stock companies were formed in years after repeal:

i) **all new joint-stock companies were still required to function under partnership law,** not corporate law, unless they could obtain a charter of

incorporation through an act of Parliament.

ii) **that meant all shareholders were simply partners under law subject to unlimited liability:** (1) that each and every shareholder could be held liable for all the debts of the company,

(2) and thus could also be sued and stripped of their assets.

iii) **Similarly shareholders could be involved in any law suit affecting the company.**

iv) **Thus the future development of joint-stock financing for large scale industrial companies depended upon extending the privileges of corporate status and limited liability to shareholders:** who otherwise would be too risk-averse to buy stocks in such companies.

c) **The current status of corporate law and limited liability**: in the 1820s

i) **neither of these was by any means new;** and many of the very large, well established joint-stock companies had such status: e.g., the Bank of England, Bank of Scotland, East India Company, Hudson's Bay Company

ii) **But corporate status had been very difficult to obtain,** at high cost.

(1) That charter of incorporation had to be enacted by Parliament;

(2) parliamentary costs and fees had to be paid for the private acts.

(3) The directors had to put up security, a deposit equal to 75% of the invested capital placed with the Bank of England, before Parliament would even consider the legislation.

(4) The directors then had to convince a parliamentary committee that the proposed corporation would be economically viable, sound, beneficial.

(5) Special request for limited liability clause then had to be made, at further cost: i.e., the limitation of liability of investors, of shareholders, to the amount invested, value of the shares purchased.

(6) A corporation under law was a separate legal entity: which could be sued, and which itself could sue, separately from the shareholders.

iii) **Thus corporate status with limited liability for all shareholders almost an impossibility:**

(1) the average manufacturing company had almost no hope of obtaining such a charter.

(2) In general, only the canal companies and later the railroads, insurance companies, and the aforementioned overseas commercial companies (East India Co, Hudson's Bay Co.,) etc. enjoyed this privilege.

iv) **Why therefore was Parliament so restrictive: why did it provide so many costly obstacles to obtaining corporate status? Mixed views of businessmen in Parliament:**

(1) Chief argument, based upon the trauma created by the South Sea Bubble scandal in 1720, was that corporate status and limited liability were reckless and dangerous:

- that they would encourage a climate of speculation and fraud,
- especially if shareholders could escape the dire consequences of bad decisions (or of fraud).

(2) hence the salutary 'dread of loss' -- the veritable 'Sword of Damocles', [15]

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[15] Answers.com: 'Sword of Damocles: Also, Damocles' sword. Impending disaster, as in: "The likelihood of lay-offs has been a sword of Damocles over the department for months." This expression alludes to the legend of Damocles, a servile courtier to King Dionysius I of Syracuse.

- with the threat of complete unlimited liability for a company's debts, for each individual shareholder, was deemed absolutely necessary to prevent such dangers:
- i.e., to ensure prudent investment and management; and above all to guarantee the reputations of British businesses; to safeguard the stability of British financial markets.

(3) Belief that unless lenders, creditors were fully protected, by being able to levy claims against stockholders as owners, then British business reputations and financial credit would suffer.

(4) **This is essentially a 'Moral Hazard' Problem:** [16]

- i.e., that those operating joint-stock corporations, so protected by limited liability, would undertake undue or excessive risks, or engage in speculative activities, that they would not consider, had they been liable for the adverse consequences
- that problem therefore involves a related problem:

(4) **'Adverse selection' theory:**

- belief that limited liability legislation would produce 'external effects of adverse selection on the cost of capital for all firms':

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The king, weary of Damocles' obsequious flattery, invited him to a banquet and seated him under a sword hung by a single hair, so as to point out to him the precariousness of his position. The idiom was first recorded in 1747. The same story gave rise to the expression "hang by a thread".'

[16] Free Dictionary (Financial Dictionary): definition of Moral Hazard: 'the risk that the existence of a contract will change the behavior of one or both parties to the contract, e.g. an insured firm will take fewer fire precautions.' See also the next note (note 12).

- i.e., by increasing the risk premium that creditors would now demand, in higher interest rates, with a greater risk of default by limited liability firms.[17]
- in other words, if the liability of shareholders, holders of equity was limited, somebody else would have to bear a disproportionate burden of the actual liability: namely the debt-holders, or creditors, who owned bonds, debentures, or mortgages
- if so, such debt-holders, would presumably respond to an increased risk, or perception of risk, by adjusting the terms of lending: namely by raising interest rates.

(5) Firms holding such views, and resisting incorporation, also preferred to raise capital internally: i.e., through retained profits and private investments of firm members, rather than pay increased interest costs for capital financing.

(6) Selfish desire of existing large-scale firms to restrict entry and thus curb competition (and protect their 'rents'):

- i.e., because they knew that limited liability would lower capital costs and thus lower barriers to entry in their industry (or commerce).
- Theory of economic historians belonging to the 'transaction cost' school.

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[17] *Adverse selection*: 'When a negotiation between two people with different amounts of information, that is, asymmetric information, restricts the quality of the good traded. This typically happens because the person with more information is able to negotiate a favourable exchange. This is frequently referred to as the "market for lemons'. A related term: *Moral Hazard*: Moral hazard occurs when a person changes behaviour to the detriment of another person, after an agreement has been reached. This is an important information problem with insurance. The problem is that the harmed party does not have information concerning the change in behaviour'. See also *Asymmetric Information*: 'The economics of information search tells us that everyone falls short of having perfect information. It suggests that everyone will have different information about different things'. The Nobel Prize in Economics in 2001 was awarded to three economists for their contributions to the economics of asymmetric information: George Akerlof, Michael Spence, and Joseph Stiglitz.

(7) Prevalence of family firms who thus feared loss of family control and family identity through incorporation with the much wider base of equity investment (share holding) that limited liability would promote.

v) **Thus the view of many at the time, and of current-day economists/economic historians,** that limited liability, in shifting the risk from equity investors (whose liability would be limited to the amount invested) to creditors -- those who lent the firm money -- would **not** lead to a reduction in a firm's capital cost nor to an increase in investment.

vi) **The validity of this view may be reflected in the very slow pace by which firms did adopt limited liability status decades after the law permitted them to do so:**

(1) Approximately two-thirds of existing British firms chose to remain unincorporated,

(2) and thus they retained the status of unlimited liability after the 1856 legislation.

vii) **Question about risks and capital markets:**

(1) who were the more 'risk adverse' in the mid to later 19th century: equity investors or lender - creditors?

(2) It may well be argued that potential equity investors were the more risk averse than standard business creditors (especially banks) because they had inferior information, or access to information to permit them to weigh the risks properly or judiciously.

(3) Hence it may be argued that limited liability legislation did provide a more balanced capital market, by shifting risk to those better informed and better able to shoulder the risks of capital investments.

d) **The Continental Alternative for Business Organization:**

i) **Société en Commandite:** The French, in the later 17th century, introduced this new and very sensible type of business organization, which was copied by many other continental countries

(1) In essence it provided limited liability for all investors – silent partners – who had no active role in the company (and so could hardly be responsible for its bad decisions)

(2) The directors and active partners who actually ran and operated the company were, conversely, subjected to unlimited liability.

ii) **since this business structure would obviate the 'moral hazard' and 'adverse selection' problems,** one wonders why the British never sought to adopt it, at least after the repeal of the Bubble Act.

iii) **We will examine this type of business organization in the second term,** when we come to continental banking and business organization.

## 7. The Coming of Limited Liability in the 1850s

a) **What then explained the change in attitudes to permit the general extension of limited liability to British businesses?**

i) **technological change and more complex machinery:** requiring much larger scale forms of production, in turn requiring far higher initial capital investments.

ii) **rapid economic expansion in mid-19th century:** similarly led to larger scale forms of enterprise requiring heavier capital investment.

iii) **increasing scale and larger capital investments meant that joint-stock companies generally had far larger numbers of stockholders than earlier**: and the impossibility of holding so many anonymous non-involved investors liable for company debts was obvious.

iv) **At same time, companies were still having difficulty in obtaining enough shareholders**: in tapping the full potential of the middle class capital markets, without offering risk-averse investors the protection of limited liability.

v) **Foreign competition**: the fact that France and Germany, as just noted, had long provided legally-protected limited liability for at least the non-involved shareholders (imposing full liability only on the active directors).

vi) **So all of these factors together finally forced the hand of Parliament:** to amend the corporation laws.

b) **Parliament and the Limited Liability Laws of the 1850s**:

i) **The Registration Act of 1844:** which facilitated the widespread ownership and exchange of company shares, while maintaining unlimited liability for share owners.

ii) **The Joint-Stock Companies Act of 1856 was the most important change in introducing limited liability**:

(1) it stipulated that any seven or more persons who registered as a joint-stock business association and who promised to produce an annual balance sheet with a list of directors were given the legal right of incorporation,

(2) with limited liability for shareholders, without further requirements, restrictions, or large fees.

iii) **Limited Liability Amendment of 1857**:

(1) limited liability rights were extended to shareholders in banks, who were originally excluded from the 1856 law;

(2) but the law still retained unlimited liability for note issues.

iv) **Amendment of 1862**:

(1) law amended to limit the liability for banknote issues.

(2) But consider also that most banks had ceased or were ceasing to issue bank notes, giving the Bank of England almost sole control over the money supply, by this era.

v) **With 10 years,** some 5,000 British companies had organized or reorganized themselves as limited liability corporations.

c) **Nevertheless corporate organization was relatively slow to spread in Britain**:

i) **as noted, that number cited,** of 5,000 incorporations, was only about one-third of the total number of British business firms.

ii) **Quite a few of these incorporations, those that were new companies, failed:**

(1) and many failed for the reasons argued by critics of limited liability legislation:

(2) i.e., that they were too easily allowed to enter their field of business.

iii) **There remained the strongly held view amongst older companies that such organization was neither necessary nor desirable:**

(1) that corporate status with limited liability would hurt a company's reputation and injure credit: for the reasons just enunciate, in terms of both ‘moral hazard’ and ‘adverse selection’.

(2) i.e., make it more difficult to borrow money.

iv) **Many businesses were family firms**

(1) thus they did not wish to surrender family control:

(2) or more importantly, to injure inheritance rights, by creating a separate legal entity (i.e., the corporation) that might end up being controlled by

outsiders.

v) **The real growth of British corporations, perhaps slower than on the continent (Germany especially), came only in the late 19th and early 20th century:**

(1) When foreign competition was growing so much more strongly, especially from Germany and the U.S., and thus when Britain was losing her industrial hegemony in many fields.

(2) When the 'Second Industrial Revolution' in power and related fields of technology demanded even larger scale and heavier investments.

## BRITISH BUSINESS CYCLES AND PRICE TRENDS, 1815 - 1914

10. **Secular Trend of 1815-1842:**

- Completion of the Industrial Revolution.
- A mild and mixed Phase B, with two depressions and two booms. *Deflationary.*

i) **1815 - 1821:** Post-Napoleonic War depression, with very painful reconversion to a peace-time economy and sudden monetary contraction
j) **1821 -1825:** Recovery and powerful boom, based especially on Latin American trade and investments; a speculative boom period
k) **1825 - 1826:** commercial crisis, financial panic, sharp recession
l) **1826 - 1836:** recovery and then very rapid boom, based especially on large railway investments, but also in cotton and iron & the U.S.
m) **1836 - 1842:** Financial crisis generated in the U.S., with a credit collapse that spread to Britain and produced severest depression of the 19th century. Also internal causes; especially in the metallurgical and railroad engineering industries. Nadir in 1841-42.

11. **Secular Trend of 1843 - 1873:**

- A very strong Phase A.
- A Secular upswing expansion, and boom known as 'Growth by Leaps and Bounds.'
- Marked the period of greatest expansion for the British economy in the 19th century and decisive hegemony of the British economy. *Inflationary.*

a) **1842 - 1845:** Recovery and renewed investment boom, especially in railways (Second Railway Boom); but also in foreign trade and loans.
b) **1845 - 1847:** financial crises & disastrous harvests. Bank failures.
c) **1847 - 1857:** recovery, strong industrial expansion and investment boom. The so-called 'Golden Age' of Britain. Especially marked by the Californian and Australian gold-mining booms; and very rapid growth of British foreign trade and foreign investments and British railway building at home and abroad. Beginnings of steam-shipping.
d) **1857 - 1858:** financial panic, briefly interrupting the boom, again originating in the United States; but only a mild depression.
e) **1859 - 1866:** renewal of the boom, and continuation of the upswing, marking the start of the 'steel revolution:' and also: the fourth and major railway construction boom; shipbuilding boom; export boom.
f) **1866 - 1868:** domestic banking and financial crisis; stock market crash. Produced severe contraction and unemployment, but only briefly.
g) **1869 - 1873:** sharp recovery and major boom, especially in shipbuilding.
h) **1873:** Financial panic in Vienna, spreading to Germany, France, U.S. and Britain. Though less severe in London, did mark the end of the great secular upswing, and beginning of a 23-year secular downswing.

12. **1873 - 1896:** The 'Great Depression.' Phase B: very *deflationary*.

13. **1896 - 1914:** Pre-War Boom and Secular Upswing.  Generally, Phase A: *inflationary*.

# THE BANK CHARTER ACT AND THE CURRENCY SCHOOL

**Symbols:** for the Fisher Identity and the Price-Specie Flow Mechanism (David Hume: 1711-76)

**M** = stock of money
**V** = transactions or income Velocity of money (average measure of stock-turnover)
**P** = price index; a measure of the average price level
**T** = total volume of transactions in a given period (year)
**y** = net national product and income [deflated Y = C + I + G + (X-M)]

**M.V ≡ P.T** (Transactions approach): Fisher Identity

**M.V ≡ P.y** (national income approach)

**X** = exports, in aggregate value
**M** or **IM** = imports, in aggregate value (IM, in order to avoid confusion with M as money)

> greater than  < less than

## A. EXPECTED CONSEQUENCES OF A TRADE DEFICIT

A trade deficit: so that the aggregate value of imports (of goods and services) exceeds the aggregate value of exports (of goods and services, i.e., including 'invisibles')

**IM > X ➜ gold outflow**

merchants purchase gold with bank notes (whose supply therefore contracts) to finance the trade deficit: i.e., they pay for the surplus of imports with gold, which flows out of the country. At the same time, the aggregate money supply contracts, thus forcing down prices:

**M↓ . V = P↓. y (or T):** assume that V and y are constants

As prices fall, imports (now relatively more expensive) also fall while exports (now relatively cheaper than rival goods abroad) rise:

**∴ IM↓ and X↑, so that X>IM ➜ gold inflow ➜ P ↑**

as exports rise to exceed imports, gold flows into the country, is exchanged for bank notes, whose increased circulation forces up prices proportionately (assuming again that V and y are constant)

∴ **IM = X** and equilibrium has been restored (with equilibrium prices and interest rates)

## B. EXPECTED CONSEQUENCES OF A TRADE SURPLUS

**X > M → gold inflow; M↑ and P↑ ➜ IM↑ and X↓** until equilibrium is restored

**The Bank Charter Act of 1844, the Quantity Theory of Money, and the Price-Specie Flow Mechanism (of David Hume)**

**The 1844 Bank Charter Act**: was based on the views of a group of contemporary monetary theorists known as the **Currency School,** whose views were based on a crude Quantity Theory of Money. In essence they believed that the quantity of money by itself determined the level of prices and the balance of trade. An increase in the quantity of money must lead to a proportional rise in prices (inflation), and thus to a rise in imports, a fall in exports, and consequently to an outflow of gold (which will then contract the money supply and thus the level of prices, to the former equilibrium).

They argued that the supply of Bank of England notes must always equal the value of gold bullion deposits in the vaults of the Bank of England (i.e., a 100% gold backed currency). Any increase or decrease in the paper money supply must be, and must only be, the automatic consequence of a corresponding increase or decrease in the Bank of England's gold reserves. No other bank notes could be issued (or withdrawn). Note that gold and Bank of England notes were freely convertible into each other.

**A. The Quantity Theory of Money and The Fisher Identity:**

The more modern version of the Quantity Theory is found in the so-called Fisher Identity, as follows:

**$M.V \equiv P.T$**

**M** = the aggregate stock of money, in gold coin and bank notes
**V** = the transactions velocity of money; i.e., the average number of times that the stock of money (£ sterling) circulates in the course of a year to effect all of the economy's transactions in that year
**P** = some measure of the price level (e.g. Consumer Price Index)
**T** = the aggregate quantity of transactions for all goods and services effected by the use of money in the course of the year.

This is simply a tautology stating that Total Spending, when measured as M x V (money stock times flows), must always equal Total Spending, when measured as P x T (total volume of transactions multiplied by the current price index).

Today, most economists would prefer the 'income' version of the Fisher Identity, replacing 'T' (which cannot be measured) with **y** = Net Real National Product or Income (i.e., measured in constant prices), as the sum of: C + I + G + (X-M), in Keynesian national income accounting. Thus: **$M.V \equiv P.y$**

**B. Hume's Price-Specie Flow Mechanism (based on the Quantity Theory):**

In the following equations, **IM** stands for the total value of imports, **X** stands for the total value of exports (goods and services), and arrows indicate the direction of gold flows: → indicates a gold outflow to finance a Current Account deficit (aka 'unfavourable balance'); and ← indicates a gold inflow that results from a surplus on Current Account (aka as 'favourable balance')

**(1) A Trade Deficit: Money, Prices, and Gold Flows**

**IM > X ➜ gold outflow**

To finance or pay for this trade deficit (surplus of imports over exports) merchants must supply Bank of England notes to purchase gold from their bankers (who purchase the gold from the Bank of England); when the Bank of England receives these notes, it destroys them, thus contracting the supply of money. As a consequence: M↓ and thus P↓ (proportionally); and as a consequence of the deflation, imports fall (because they are relatively more expensive than domestic goods) and exports rise (because they are relatively cheaper than foreign goods):

**IM↓ and X↑** to produce a Current Account surplus and a gold inflow, as in the next model

**(2) A Trade Surplus: Money, Prices, and Gold Flows**

**X > IM ⬅ gold inflow**, so that **M↑ and P↑** (proportionally); and subsequently **X↓ and IM↑**, until **X = IM**.

A trade surplus produces an inflow of gold, since foreign buyers must make up the difference between the two in gold (i.e., exports exceed imports in value). The gold so acquired by exporting merchants is sold to their bankers, who supply them with Bank of England notes in return, thus increasing the money supply. As a consequence, prices rise to their former level, imports (now relatively cheaper) rise to their former level, exports (now relatively more expensive) fall back to their former level, and equilibrium in both prices and trade is restored.

C. **Faults in the Currency School's Monetary Analysis:**

1. **Definition of Money**:

a) Their definition of money was much too narrow, in overlooking the role of negotiable and transferable credit instruments as money, in particular bank cheques. Indeed, in so restricting the supply and circulation of bank notes, the 1844 Bank Charter Act stimulated a disproportionate increase in chequing – a relative increase in commercial transactions effected by cheque and other credit instruments.

b) Consequently changes in the bullion reserves of the Bank of England did not produce proportional changes in the effective money supply (nor, for reasons given below, in the price level).

c) Note: from the late 1840s, gold mining booms in both California and Australia substantially increased world gold stocks and Britain's gold reserves independently of trade flows.

2. **Crudeness of their Quantity Theory:**

a) They were unaware of and thus ignored the two other variables in this Quantity Theory identity: Velocity and Transactions; and as noted above, it is preferable to replace **T** with **y**. Changes in **M** may be produce related changes in **V** and **y**, or be accompanied by autonomous changes in these two variables.

b) Thus, an increase or decrease in **M** almost never produces a directly proportional change in **P**, because changes in **M** may produce partially or wholly offsetting changes in both **V** and **y** (so long as the economy has not reached a stage of 'full employment', with all inputs, and not just labour, fully employed). An increase in the money supply may produce inflation, but not in direct proportion; and an increase in the money supply may result in **no** inflation, if that increase reduces the need to economize on money, so that **V** falls, and if that increase stimulates a growth of investment, production, and net output, so that **y** rises. If there is an autonomous rise in **y** (net national product) the money supply (**M**) indeed should grow correspondingly to accommodate that growth in the real economy.

D. **The Monetary Approach to the Balance of Payments**

The Canadian economist Harry Johnson first proposed this theoretical model, which contradicts or is opposed to the classic Price-Specie Flow mechanism. Its basic tenets are as follows:

1. World gold stocks determine a world price level (under a gold standard, with currencies freely convertible into gold).

2. By the international 'law of one price', world prices and price changes anywhere are quickly transmitted to all countries via commodity and capital markets -- indeed by arbitrage traders -- without necessarily requiring any corresponding gold flows.

3. On the assumption that domestic money supplies are essentially endogenous, the combination of the changed national price level and domestic **real** incomes and **real** balances will then determine the requisite money supply to meet these needs in equilibrium.

4. By this theory, therefore, while world gold stocks determine the world price level, world prices determine national prices which in turn (with real incomes) determine domestic money stocks.

5. So crudely stated, this theory also assumes stability in both **V** and **y**: i.e., it neglects to consider autonomous changes in **Velocity** (V), i.e., changes in the demand for real balances (k = 1/V), changes in credit institutions, in productivity, real incomes, etc. and other factors constituting **y**.

**APPENDIX ON BRITISH BANKING IN THE 18TH AND 19TH CENTURIES:**

**SHORT-TERM LENDING AND THE REAL BILLS DOCTRINE**

(1) **Short-term lending, and chiefly by discounting commercial bills, is the most striking feature of British banking -- both English and Scottish -- during the Industrial Revolution era and on into the 19th century:** short-term loans, short-term credit, for essentially working-capital needs, as opposed to longer term loans for financing fixed capital formation (in plant and machinery).

(2) **This is in quite striking contrast to subsequent developments in continental and even American banking:** which came to engage in what we call investment banking to provide such long-term capital financing -- for financing fixed capital formation, especially in underwriting stock and bond issues.

(3) **We will subsequently explore many and various reasons for this persistent contrast:** as well as some limited ventures by London banks in investment banking in the very late 19th century.

(4) **But for now it is important to understand the philosophical importance** of the so-called **Real Bills Doctrine** that underlay British economic thought and banking practice in the 18th and 19th centuries.

(a) **Real Bills:** that banks must not inflate the issues of credit and money but must restrict themselves only to issuing credit -- and that in bank notes -- that is fully backed by real goods.

(b) **More concretely:** that bank lending must be restricted to discounting commercial bills which in turn represent the production of actual goods in the very near future, so that those goods or inventories of goods will provide the real backing for the credit so issued.

(c) **In our example of discounting,** we saw that the whole purpose was to secure bank credit in order to finance the working capital needs of the firm in producing, within the next 90 days or so, the goods that it had promised to sell and supply: in this case, so many yards of cotton yarn.

**Table 1.**

**BANKING STRUCTURES IN ENGLAND & WALES AND THE UNITED KINGDOM**

**EW:** England and Wales

**UK:** United Kingdom (England, Wales, Scotland, and Ireland)

**PB:** private partnership banks

**JSB:** joint-stock banks

| Year | EW: Private Banks | EW: PB Offices/ Branches | EW: Joint-Stock Banks | EW: JSB Offices/ Branches | UK: Total Banks | UK: Total Offices/ Branches | UK: Average No. of Branches |
|---|---|---|---|---|---|---|---|
| **1850** | 327 | 518 | 99 | 576 | **459** | 1685 | 3.67 |
| **1875** | 236 | 595 | 122 | 1364 | **381** | 3320 | 8.71 |
| **1900** | 81 | 358 | 83 | 4212 | **184** | 6269 | 34.07 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1913** | 29 | 147 | 41 | 6426 | **88** | 8610 | 97.84 |

Michael Collins, *Banks and Industrial Finance in Britain, 1800 - 1939*, Studies in Economic and Social History (London: Macmillan, 1991).

**Table 2.**

**Stock of Money, Means of Payment, and National Income in England and Wales**

**1750 - 1913, in millions £ sterling**

| **Money** | **1750** | **1775** | **1801** | **1811** | **1821** | **1831** | **1844** | **1855** | **1865** | **1875** | **1885** | **1913** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Specie** | 15.0 | 16.0 | 20.0 | 15.0 | 18.0 | 30.0 | 36.0 | 50 | 70 | 105 | 109 | 145 |
| **Banknotes** | 5.0 | 10.0 | 25.0 | 45.0 | 32.0 | 29.0 | 28.5 | 26.7 | 27.0 | 32.2 | 27.7 | 44.7 |
| **Deposits*** | | | 5.0 | 15.0 | 25.0 | 40.0 | 80.5 | 145.0 | 270.0 | 409.0 | 458.0 | 1,074.5 |
| **Total M1** | **20** | **26** | **50** | **75** | **75** | **99** | **145** | **221.7** | **367** | **546.2** | **594.7** | **1264.2** |
| **Other*** | 20.0 | 37.0 | 115.0 | 140.0 | 76.0 | 67.0 | 75.0 | 153.0 | | 32.4 | | |
| **Total M2** | 40.0 | 63.0 | 165.0 | 215.0 | 151.0 | 166.0 | 220.0 | 374.7 | | 578.6 | | |
| **Components of Money Stock in percentages** | | | | | | | | | | | | |
| **Specie** | 75.0 | 61.5 | 40.0 | 20.0 | 24.0 | 30.3 | 25.0 | 22.6 | 19.1 | 19.2 | 18.3 | 11.5 |
| **Banknotes** | 25 | 38.5 | 50.0 | 60.0 | 42.7 | 29.3 | 20.0 | 12.0 | 7.4 | 5.9 | 4.7 | 3.5 |
| **Deposits*** | | | 10.0 | 20.0 | 33.3 | 40.4 | 55.0 | 65.4 | 73.5 | 74.9 | 77.0 | 85.0 |
| **Total M1** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **Components of Means of Payment in percentages** | | | | | | | | | | | | |
| **Specie** | 37.5 | 25.4 | 12.1 | 7.0 | 11.9 | 18.1 | 16.4 | 13.3 | | 18.1 | | |
| **Banknotes** | 12.5 | 15.9 | 15.2 | 20.9 | 21.2 | 17.4 | 12.9 | 7.1 | | 5.6 | | |
| **Deposits*** | | | 3.0 | 7.0 | 16.6 | 24.1 | 36.6 | 38.7 | | 70.7 | | |
| **Other*** | 50.0 | 58.7 | 69.7 | 65.1 | 50.3 | 40.4 | 34.1 | 40.9 | | 5.6 | | |
| **Total M2** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | | 100.0 | | |
| **National Income** | 100.0 | 135.0 | 196.7 | 255.9 | 247.4 | 290.7 | 403.8 | 474.5 | 640.7 | 896.9 | 928.2 | 2,265.0 |
| **Per Capita Income** in £ sterling | 16.3 | 18.2 | 21.7 | 24.8 | 20.5 | 20.8 | 24.4 | 25.2 | 30.3 | 37.3 | 34.1 | 49.6 |

Rondo Cameron, ed., *Banking in the Early Stages of Industrialization* (London, 1967), Introduction and chapter 2: 'England, 1750-1844'

* bank deposits (chequing accounts) are included in ‘Other Means of Payment’ until 1801.

**Table 3**

**World Gold Mining Outputs in the 19th Century**
**Average annual outputs in metric tonnes**

| Decade | Australia | New Zealand | Russia | South Africa | Rhodesia | Mexico | Canada | United States | World Total | Total in kg. |
|---|---|---|---|---|---|---|---|---|---|---|
| **1850-59** | 76.8 | 0.3 | 25.4 | | | | | 83.4 | **185.9** | **185,900** |
| **1860-69** | 61.9 | 14.1 | 25.1 | | | | | 70.6 | **171.7** | **171,700** |
| **1870-79** | 46.0 | 12.0 | 37.1 | | | 1.6 | | 61.5 | **158.2** | **158,200** |
| **1880-89** | 35.8 | 6.7 | 34.8 | 4.5 | | 1.6 | 2.0 | 49.6 | **135.0** | **135,000** |
| **1890-99** | 59.7 | 8.4 | 38.4 | 62.0 | 1.2 | 8.0 | 7.7 | 70.2 | **255.6** | **255,600** |
| **1900-14** | 94.6 | 13.4 | 39.9 | 171.2 | 14.6 | 25.1 | 22.8 | 132.3 | **513.9** | **513,900** |
| **Totals** | **374.8** | **54.9** | **200.7** | **237.7** | **15.8** | **36.3** | **32.5** | **467.6** | **1,420.3** | **1,420,300** |
| **Percent** | **26.4%** | **3.9%** | **14.1%** | **16.7%** | **1.1%** | **2.6%** | **2.3%** | **32.9%** | **100.0%** | |

**Sources:** C.J. Schmitz, World Non-Ferrous Metal Production and Prices, 1700-1976 (London, 1979); Barry Eichengreen and Ian McLean, 'The Supply of Gold under the Pre-1914 Gold Standard', *Economic History Review*, 2nd ser. 47:2 (May 1994).

**Table 4:**

**Money Supply, GDP, and Prices in Canada, 1955 - 2007: Annual Means of monthly data**

| Year | M: MB<br>Money: Monetary Base in billions | V = Y/M<br>Income Velocity of M: Mon Base | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y<br>Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **1955** | 2.2588 | | | 16.83 | | | 15,681,250 | | 1.896 | |
| **1956** | 2.3793 | | | 17.07 | | | 16,070,250 | 1.39% | 3.153 | |
| **1957** | 2.4378 | | | 17.60 | | | 16,579,500 | 3.12% | 4.023 | |
| **1958** | 2.5973 | | | 18.04 | | | 17,062,250 | 2.51% | 2.499 | |
| **1959** | 2.7276 | | | 18.25 | | | 17,467,500 | 1.15% | 5.128 | |
| **1960** | 2.7500 | | | 18.48 | | | 17,855,250 | 1.23% | 3.539 | |
| **1961** | 2.8565 | 14.414 | 0.06938 | 18.70 | 220.176 | 41.1730 | 18,224,500 | 1.22% | 3.061 | 12,081.34 |
| **1962** | 3.0239 | 14.771 | 0.06770 | 18.87 | 236.740 | 44.6650 | 18,570,750 | 0.89% | 4.477 | 12,748.02 |
| **1963** | 3.1361 | 15.293 | 0.06539 | 19.22 | 249.561 | 47.9610 | 18,919,000 | 1.86% | 3.875 | 13,191.00 |
| **1964** | 3.3160 | 15.847 | 0.06310 | 19.57 | 268.564 | 52.5490 | 19,277,250 | 1.81% | 4.042 | 13,931.65 |
| **1965** | 3.5971 | 16.105 | 0.06209 | 20.03 | 289.288 | 57.9300 | 19,633,500 | 2.34% | 4.292 | 14,734.43 |
| **1966** | 3.8743 | 16.730 | 0.05977 | 20.78 | 311.875 | 64.8180 | 19,997,500 | 3.79% | 5.167 | 15,595.69 |
| **1967** | 4.1888 | 16.639 | 0.06010 | 21.53 | 323.675 | 69.6980 | 20,363,750 | 3.61% | 4.979 | 15,894.66 |
| **1968** | 4.2691 | 17.833 | 0.05608 | 22.39 | 339.997 | 76.1310 | 20,692,000 | 3.99% | 6.792 | 16,431.33 |
| **1969** | 4.7133 | 17.785 | 0.05623 | 23.43 | 357.717 | 83.8250 | 20,994,250 | 4.65% | 7.458 | 17,038.80 |
| **1970** | 4.9789 | 18.112 | 0.05521 | 24.21 | 372.512 | 90.1790 | 21,287,500 | 3.31% | 7.125 | 17,499.11 |
| **1971** | 5.5635 | 17.692 | 0.05652 | 24.87 | 395.827 | 98.4290 | 21,747,314 | 2.72% | 5.188 | 18,201.19 |
| **1972** | 6.3914 | 17.197 | 0.05815 | 26.08 | 421.392 | 109.9130 | 22,187,140 | 4.89% | 4.750 | 18,992.61 |
| **1973** | 7.3540 | 17.535 | 0.05703 | 28.06 | 459.600 | 128.9560 | 22,453,775 | 7.57% | 6.125 | 20,468.70 |
| **1974** | 8.3454 | 18.458 | 0.05418 | 31.13 | 494.769 | 154.0380 | 22,772,045 | 10.96% | 8.500 | 21,727.02 |
| **1975** | 9.7236 | 17.856 | 0.05600 | 34.46 | 503.858 | 173.6210 | 23,102,980 | 10.68% | 8.500 | 21,809.21 |
| **1976** | 10.9117 | 18.328 | 0.05456 | 37.06 | 539.673 | 199.9940 | 23,414,365 | 7.55% | 9.292 | 23,048.82 |
| **1977** | 12.0083 | 18.402 | 0.05434 | 40.03 | 552.087 | 220.9730 | 23,694,035 | 8.01% | 7.708 | 23,300.69 |
| **1978** | 13.4578 | 18.196 | 0.05496 | 43.61 | 561.537 | 244.8770 | 23,935,651 | 8.95% | 8.979 | 23,460.28 |
| **1979** | 14.8698 | 18.802 | 0.05319 | 47.59 | 587.449 | 279.5770 | 24,170,445 | 9.13% | 12.104 | 24,304.45 |
| **1980** | 16.0130 | 19.633 | 0.05093 | 52.43 | 599.695 | 314.3900 | 24,471,129 | 10.16% | 12.891 | 24,506.22 |

**Money Supply, GDP, and Prices in Canada, 1955 - 2007: Annual Means of monthly data**

| Year | M: MB<br>Money: Monetary Base in billions | V = Y/M<br>Income Velocity of M: Mon Base | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **1981** | 17.1964 | 20.962 | 0.04771 | 58.94 | 611.572 | 360.4710 | 24,785,059 | 12.43% | 17.931 | 24,675.05 |
| **1982** | 17.4193 | 21.807 | 0.04586 | 65.31 | 581.639 | 379.8590 | 25,083,479 | 10.80% | 13.958 | 23,188.15 |
| **1983** | 17.7398 | 23.190 | 0.04312 | 69.13 | 595.062 | 411.3860 | 25,336,505 | 5.86% | 9.553 | 23,486.34 |
| **1984** | 17.9203 | 25.088 | 0.03986 | 72.11 | 623.481 | 449.5820 | 25,577,353 | 4.30% | 11.312 | 24,376.30 |
| **1985** | 18.7576 | 25.894 | 0.03862 | 74.97 | 647.907 | 485.7140 | 25,813,854 | 3.96% | 9.647 | 25,099.18 |
| **1986** | 19.9900 | 25.640 | 0.03900 | 78.10 | 656.262 | 512.5410 | 26,068,353 | 4.18% | 9.214 | 25,174.68 |
| **1987** | 21.0964 | 26.495 | 0.03774 | 81.49 | 685.897 | 558.9490 | 26,399,956 | 4.34% | 8.403 | 25,981.00 |
| **1988** | 22.2465 | 27.559 | 0.03629 | 84.79 | 723.059 | 613.0940 | 26,754,940 | 4.05% | 9.686 | 27,025.26 |
| **1989** | 23.5343 | 27.948 | 0.03578 | 89.03 | 738.813 | 657.7280 | 27,219,748 | 4.99% | 12.293 | 27,142.53 |
| **1990** | 24.4104 | 27.854 | 0.03590 | 93.27 | 729.008 | 679.9210 | 27,638,583 | 4.76% | 13.045 | 26,376.44 |
| **1991** | 25.3470 | 27.039 | 0.03698 | 98.51 | 695.745 | 685.3670 | 27,987,829 | 5.62% | 9.034 | 24,858.85 |
| **1992** | 26.7329 | 26.203 | 0.03816 | 99.98 | 700.655 | 700.4800 | 28,319,473 | 1.49% | 6.783 | 24,741.11 |
| **1993** | 28.2746 | 25.719 | 0.03888 | 101.83 | 714.092 | 727.1840 | 28,648,235 | 1.86% | 5.088 | 24,926.22 |
| **1994** | 29.2574 | 26.348 | 0.03795 | 102.00 | 755.758 | 770.8730 | 28,958,270 | 0.16% | 5.766 | 26,098.17 |
| **1995** | 29.5420 | 27.433 | 0.03645 | 104.21 | 777.698 | 810.4260 | 29,262,649 | 2.17% | 7.308 | 26,576.47 |
| **1996** | 30.1993 | 27.711 | 0.03609 | 105.85 | 790.613 | 836.8640 | 29,570,577 | 1.58% | 4.531 | 26,736.48 |
| **1997** | 31.7384 | 27.813 | 0.03595 | 107.57 | 820.638 | 882.7330 | 29,868,726 | 1.62% | 3.521 | 27,474.83 |
| **1998** | 33.5764 | 27.250 | 0.03670 | 108.63 | 842.258 | 914.9730 | 30,125,715 | 0.99% | 5.104 | 27,958.11 |
| **1999** | 36.5423 | 26.885 | 0.03720 | 110.52 | 888.953 | 982.4410 | 30,369,575 | 1.73% | 4.917 | 29,271.16 |
| **2000** | 38.1102 | 28.223 | 0.03543 | 113.53 | 947.357 | 1,075.5660 | 30,650,631 | 2.73% | 5.771 | 30,908.24 |
| **2001** | 39.6666 | 27.919 | 0.03582 | 116.41 | 951.357 | 1,107.4590 | 30,973,522 | 2.53% | 4.313 | 30,715.17 |
| **2002** | 42.3101 | 27.280 | 0.03666 | 119.03 | 969.716 | 1,154.2040 | 31,322,332 | 2.25% | 2.708 | 30,959.24 |
| **2003** | 43.9059 | 27.700 | 0.03610 | 122.32 | 994.297 | 1,216.1910 | 31,626,552 | 2.77% | 3.188 | 31,438.68 |
| **2004** | 45.2319 | 28.524 | 0.03506 | 124.56 | 1,035.808 | 1,290.1850 | 31,932,015 | 1.83% | 2.500 | 32,437.91 |
| **2005** | 47.3058 | 28.991 | 0.03449 | 127.34 | 1,076.965 | 1,371.4250 | 32,258,138 | 2.23% | 2.917 | 33,385.84 |
| **2006** | 49.6239 | 29.145 | 0.03431 | 129.90 | 1,113.400 | 1,446.3070 | 32,603,606 | 2.01% | 4.313 | 34,149.61 |
| **2007** | 52.1695 | 29.436 | 0.03397 | 131.65 | 1,166.461 | 1,535.6460 | 32,881,904 | 1.35% | 4.604 | 35,474.26 |
| **2008** | 54.4343 | 29.395 | 0.03402 | 135.78 | 1,178.445 | 1,600.0810 | 33,260,314 | 3.14% | 3.208 | 35,430.97 |

| Money | Source | Definition |
|---|---|---|
| Monetary Base | CANSIM | notes and coin in circulation, chartered bank and other Canadian Payments Association members' deposits with the Bank of Canada |
| M1 | IMF | notes, coins, chequeable deposits: narrowly defined |
| M1B | CANSIM | currency outside banks, chartered bank chequeable deposits, less inter-bank chequeable deposits |
| M1+ Gross | IMF | M1 broadly defined: notes, coins, chequeable and other deposits; Canada Savings Bond and other liquid assets |

CANSIM = Canadian Socio-Economic Information Management System: operated by Statistics Canada.

**Table 5:**

**Money Supply, GDP, and Prices in Canada, 1955 - 2007: Annual Means of monthly data**

| Year | M1<br>Money: M1 narrow in billions IMF data* | V = Y/M<br>Income Velocity of M: M1 (MIF) | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y<br>Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **1955** | 4.7720 | | | 16.83 | | | 15,681,250 | | 1.896 | |
| **1956** | 4.7610 | | | 17.07 | | | 16,070,250 | 1.39% | 3.153 | |
| **1957** | 4.7880 | | | 17.60 | | | 16,579,500 | 3.12% | 4.023 | |
| **1958** | 5.4200 | | | 18.04 | | | 17,062,250 | 2.51% | 2.499 | |
| **1959** | 5.2330 | | | 18.25 | | | 17,467,500 | 1.15% | 5.128 | |
| **1960** | 5.4990 | | | 18.48 | | | 17,855,250 | 1.23% | 3.539 | |
| **1961** | 5.8510 | 7.037 | 0.14211 | 18.70 | 220.176 | 41.1730 | 18,224,500 | 1.22% | 3.061 | 12,081.34 |
| **1962** | 6.0770 | 7.350 | 0.13606 | 18.87 | 236.740 | 44.6650 | 18,570,750 | 0.89% | 4.477 | 12,748.02 |
| **1963** | 6.2960 | 7.618 | 0.13127 | 19.22 | 249.561 | 47.9610 | 18,919,000 | 1.86% | 3.875 | 13,191.00 |
| **1964** | 6.6930 | 7.851 | 0.12737 | 19.57 | 268.564 | 52.5490 | 19,277,250 | 1.81% | 4.042 | 13,931.65 |
| **1965** | 7.1300 | 8.125 | 0.12308 | 20.03 | 289.288 | 57.9300 | 19,633,500 | 2.34% | 4.292 | 14,734.43 |
| **1966** | 7.7180 | 8.398 | 0.11907 | 20.78 | 311.875 | 64.8180 | 19,997,500 | 3.79% | 5.167 | 15,595.69 |
| **1967** | 8.3550 | 8.342 | 0.11987 | 21.53 | 323.675 | 69.6980 | 20,363,750 | 3.61% | 4.979 | 15,894.66 |
| **1968** | 8.9070 | 8.547 | 0.11700 | 22.39 | 339.997 | 76.1310 | 20,692,000 | 3.99% | 6.792 | 16,431.33 |
| **1969** | 9.2410 | 9.071 | 0.11024 | 23.43 | 357.717 | 83.8250 | 20,994,250 | 4.65% | 7.458 | 17,038.80 |
| **1970** | 9.7620 | 9.238 | 0.10825 | 24.21 | 372.512 | 90.1790 | 21,287,500 | 3.31% | 7.125 | 17,499.11 |
| **1971** | 11.4840 | 8.571 | 0.11667 | 24.87 | 395.827 | 98.4290 | 21,747,314 | 2.72% | 5.188 | 18,201.19 |
| **1972** | 13.1660 | 8.348 | 0.11979 | 26.08 | 421.392 | 109.9130 | 22,187,140 | 4.89% | 4.750 | 18,992.61 |
| **1973** | 14.6350 | 8.811 | 0.11349 | 28.06 | 459.600 | 128.9560 | 22,453,775 | 7.57% | 6.125 | 20,468.70 |
| **1974** | 15.4930 | 9.942 | 0.10058 | 31.13 | 494.769 | 154.0380 | 22,772,045 | 10.96% | 8.500 | 21,727.02 |
| **1975** | 19.0380 | 9.120 | 0.10965 | 34.46 | 503.858 | 173.6210 | 23,102,980 | 10.68% | 8.500 | 21,809.21 |
| **1976** | 19.3950 | 10.312 | 0.09698 | 37.06 | 539.673 | 199.9940 | 23,414,365 | 7.55% | 9.292 | 23,048.82 |
| **1977** | 21.7090 | 10.179 | 0.09824 | 40.03 | 552.087 | 220.9730 | 23,694,035 | 8.01% | 7.708 | 23,300.69 |
| **1978** | 23.6170 | 10.369 | 0.09644 | 43.61 | 561.537 | 244.8770 | 23,935,651 | 8.95% | 8.979 | 23,460.28 |
| **1979** | 24.5860 | 11.371 | 0.08794 | 47.59 | 587.449 | 279.5770 | 24,170,445 | 9.13% | 12.104 | 24,304.45 |

**Money Supply, GDP, and Prices in Canada, 1955 - 2007: Annual Means of monthly data**

| Year | M1<br>Money: M1 narrow in billions IMF data* | V = Y/M<br>Income Velocity of M: M1 (MIF) | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y<br>Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **1980** | 27.2790 | 11.525 | 0.08677 | 52.43 | 599.695 | 314.3900 | 24,471,129 | 10.16% | 12.891 | 24,506.22 |
| **1981** | 27.4590 | 13.128 | 0.07618 | 58.94 | 611.572 | 360.4710 | 24,785,059 | 12.43% | 17.931 | 24,675.05 |
| **1982** | 28.4780 | 13.339 | 0.07497 | 65.31 | 581.639 | 379.8590 | 25,083,479 | 10.80% | 13.958 | 23,188.15 |
| **1983** | 30.8670 | 13.328 | 0.07503 | 69.13 | 595.062 | 411.3860 | 25,336,505 | 5.86% | 9.553 | 23,486.34 |
| **1984** | 31.0720 | 14.469 | 0.06911 | 72.11 | 623.481 | 449.5820 | 25,577,353 | 4.30% | 11.312 | 24,376.30 |
| **1985** | 34.3750 | 14.130 | 0.07077 | 74.97 | 647.907 | 485.7140 | 25,813,854 | 3.96% | 9.647 | 25,099.18 |
| **1986** | 36.6630 | 13.980 | 0.07153 | 78.10 | 656.262 | 512.5410 | 26,068,353 | 4.18% | 9.214 | 25,174.68 |
| **1987** | 39.7930 | 14.046 | 0.07119 | 81.49 | 685.897 | 558.9490 | 26,399,956 | 4.34% | 8.403 | 25,981.00 |
| **1988** | 42.5870 | 14.396 | 0.06946 | 84.79 | 723.059 | 613.0940 | 26,754,940 | 4.05% | 9.686 | 27,025.26 |
| **1989** | 44.0600 | 14.928 | 0.06699 | 89.03 | 738.813 | 657.7280 | 27,219,748 | 4.99% | 12.293 | 27,142.53 |
| **1990** | 43.6960 | 15.560 | 0.06427 | 93.27 | 729.008 | 679.9210 | 27,638,583 | 4.76% | 13.045 | 26,376.44 |
| **1991** | 46.1710 | 14.844 | 0.06737 | 98.51 | 695.745 | 685.3670 | 27,987,829 | 5.62% | 9.034 | 24,858.85 |
| **1992** | 49.1970 | 14.238 | 0.07023 | 99.98 | 700.655 | 700.4800 | 28,319,473 | 1.49% | 6.783 | 24,741.11 |
| **1993** | 56.5290 | 12.864 | 0.07774 | 101.83 | 714.092 | 727.1840 | 28,648,235 | 1.86% | 5.088 | 24,926.22 |
| **1994** | 60.9850 | 12.640 | 0.07911 | 102.00 | 755.758 | 770.8730 | 28,958,270 | 0.16% | 5.766 | 26,098.17 |
| **1995** | 65.5270 | 12.368 | 0.08086 | 104.21 | 777.698 | 810.4260 | 29,262,649 | 2.17% | 7.308 | 26,576.47 |
| **1996** | 77.9190 | 10.740 | 0.09311 | 105.85 | 790.613 | 836.8640 | 29,570,577 | 1.58% | 4.531 | 26,736.48 |
| **1997** | 86.4950 | 10.206 | 0.09799 | 107.57 | 820.638 | 882.7330 | 29,868,726 | 1.62% | 3.521 | 27,474.83 |
| **1998** | 93.6230 | 9.773 | 0.10232 | 108.63 | 842.258 | 914.9730 | 30,125,715 | 0.99% | 5.104 | 27,958.11 |
| **1999** | 101.1830 | 9.710 | 0.10299 | 110.52 | 888.953 | 982.4410 | 30,369,575 | 1.73% | 4.917 | 29,271.16 |
| **2000** | 116.1030 | 9.264 | 0.10795 | 113.53 | 947.357 | 1,075.5660 | 30,650,631 | 2.73% | 5.771 | 30,908.24 |
| **2001** | 133.8580 | 8.273 | 0.12087 | 116.41 | 951.357 | 1,107.4590 | 30,973,522 | 2.53% | 4.313 | 30,715.17 |
| **2002** | 140.1970 | 8.233 | 0.12147 | 119.03 | 969.716 | 1,154.2040 | 31,322,332 | 2.25% | 2.708 | 30,959.24 |
| **2003** | 153.7390 | 7.911 | 0.12641 | 122.32 | 994.297 | 1,216.1910 | 31,626,552 | 2.77% | 3.188 | 31,438.68 |
| **2004** | 170.1790 | 7.581 | 0.13190 | 124.56 | 1,035.808 | 1,290.1850 | 31,932,015 | 1.83% | 2.500 | 32,437.91 |
| **2005** | 188.7220 | 7.267 | 0.13761 | 127.34 | 1,076.965 | 1,371.4250 | 32,258,138 | 2.23% | 2.917 | 33,385.84 |
| **2006** | 215.3450 | 6.716 | 0.14889 | 129.90 | 1,113.400 | 1,446.3070 | 32,603,606 | 2.01% | 4.313 | 34,149.61 |
| **2007** | 226.3917 | 6.783 | 0.14742 | 131.65 | 1,166.461 | 1,535.6460 | 32,881,904 | 1.35% | 4.604 | 35,474.26 |

**Money Supply, GDP, and Prices in Canada, 1955 - 2007: Annual Means of monthly data**

| Year | M1<br>Money: M1 narrow in billions IMF data* | V = Y/M<br>Income Velocity of M: M1 (MIF) | k<br>Cambridge cash balances k = 1/V | P<br>CPI June 1992= 100.00 CANSIM | y<br>Real GDP: in billions of 1992 dollars CANSIM | GDP = Y<br>Gross Domestic Product in billions current market prices CANSIM | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate in percent | Real GDP per capita in dollars |
|---|---|---|---|---|---|---|---|---|---|---|

* M1 data not available after 2007.

| Money | Source | Definition |
|---|---|---|
| Monetary Base | CANSIM | notes and coin in circulation, chartered bank and other Canadian Payments Association members' deposits with the Bank of Canada |
| M1 | IMF | notes, coins, chequeable deposits: narrowly defined |
| M1B | CANSIM | currency outside banks, chartered bank chequeable deposits, less inter-bank chequeable deposits |
| M1+ Gross | IMF | M1 broadly defined: notes, coins, chequeable and other deposits; Canada Savings Bond and other liquid asset |

CANSIM = Canadian Socio-Economic Information Management System: operated by Statistics Canada.

Table 6. **Money Supply, GDP, Interest Rates, and Prices in Canada, 1975 - 2011: Annual Means of monthly data**

| Year | M<br>M1+ Gross<br>$ billions | V<br>= Y/M<br>Income Velocity of M1+ Gross | k<br>=1/V<br>Cambridge cash balances | P<br>CPI 2002=100 | y<br>= Y/CPI<br>Real GDP: $ billions in 2002 dollars | GDP<br>= Y<br>Gross Domestic Product in $ billions at current market prices | Population<br>Canadian population in millions | Inflation:<br>Percent Change in CPI | Bank Rate<br>Bank Rate (percent) | Real GDP p.c.<br>Real GDP per capita in 2002 dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **1975** | 34.913 | 4.973 | 0.20109 | 28.96 | 599.591 | 173.6210 | 23,102,980 | 10.68% | 8.500 | 25,952.96 |
| **1976** | 35.719 | 5.599 | 0.17860 | 31.14 | 642.211 | 199.9940 | 23,414,365 | 7.55% | 9.292 | 27,428.10 |
| **1977** | 39.682 | 5.569 | 0.17958 | 33.63 | 656.984 | 220.9730 | 23,694,035 | 8.01% | 7.708 | 27,727.83 |
| **1978** | 42.886 | 5.710 | 0.17513 | 36.65 | 668.229 | 244.8770 | 23,935,651 | 8.95% | 8.979 | 27,917.74 |
| **1979** | 44.782 | 6.243 | 0.16018 | 39.99 | 699.065 | 279.5770 | 24,170,445 | 9.13% | 12.104 | 28,922.30 |
| **1980** | 51.033 | 6.161 | 0.16232 | 44.05 | 713.637 | 314.3900 | 24,471,129 | 10.16% | 12.891 | 29,162.40 |
| **1981** | 49.873 | 7.228 | 0.13836 | 49.53 | 727.771 | 360.4710 | 24,785,059 | 12.43% | 17.931 | 29,363.30 |
| **1982** | 55.175 | 6.885 | 0.14525 | 54.88 | 692.151 | 379.8590 | 25,083,479 | 10.80% | 13.958 | 27,593.90 |
| **1983** | 62.592 | 6.573 | 0.15215 | 58.10 | 708.123 | 411.3860 | 25,336,505 | 5.86% | 9.553 | 27,948.74 |
| **1984** | 70.527 | 6.375 | 0.15687 | 60.60 | 741.943 | 449.5820 | 25,577,353 | 4.30% | 11.312 | 29,007.80 |
| **1985** | 89.427 | 5.431 | 0.18411 | 63.00 | 771.009 | 485.7140 | 25,813,854 | 3.96% | 9.647 | 29,868.03 |
| **1986** | 102.767 | 4.987 | 0.20050 | 65.63 | 780.952 | 512.5410 | 26,068,353 | 4.18% | 9.214 | 29,957.87 |
| **1987** | 108.522 | 5.151 | 0.19415 | 68.48 | 816.218 | 558.9490 | 26,399,956 | 4.34% | 8.403 | 30,917.38 |
| **1988** | 116.428 | 5.266 | 0.18990 | 71.25 | 860.441 | 613.0940 | 26,754,940 | 4.05% | 9.686 | 32,160.06 |
| **1989** | 125.911 | 5.224 | 0.19143 | 74.81 | 879.187 | 657.7280 | 27,219,748 | 4.99% | 12.293 | 32,299.60 |
| **1990** | 128.499 | 5.291 | 0.18899 | 78.40 | 867.246 | 679.9210 | 27,638,583 | 4.76% | 13.045 | 31,378.10 |
| **1991** | 134.510 | 5.095 | 0.19626 | 82.80 | 827.738 | 685.3670 | 27,987,829 | 5.62% | 9.034 | 29,574.92 |
| **1992** | 139.841 | 5.009 | 0.19964 | 84.00 | 833.905 | 700.4800 | 28,319,473 | 1.49% | 6.783 | 29,446.34 |
| **1993** | 151.501 | 4.800 | 0.20834 | 85.60 | 849.514 | 727.1840 | 28,648,235 | 1.86% | 5.088 | 29,653.28 |
| **1994** | 156.280 | 4.933 | 0.20273 | 85.70 | 899.502 | 770.8730 | 28,958,270 | 0.16% | 5.766 | 31,062.00 |
| **1995** | 160.398 | 5.053 | 0.19792 | 87.60 | 925.144 | 810.4260 | 29,262,649 | 2.17% | 7.308 | 31,615.18 |
| **1996** | 179.464 | 4.663 | 0.21445 | 88.90 | 941.354 | 836.8640 | 29,570,577 | 1.58% | 4.531 | 31,834.15 |
| **1997** | 197.601 | 4.467 | 0.22385 | 90.40 | 976.475 | 882.7330 | 29,868,726 | 1.62% | 3.521 | 32,692.21 |
| **1998** | 205.509 | 4.452 | 0.22461 | 91.30 | 1,002.161 | 914.9730 | 30,125,715 | 0.99% | 5.104 | 33,265.97 |
| **1999** | 221.764 | 4.430 | 0.22573 | 92.90 | 1,057.525 | 982.4410 | 30,369,575 | 1.73% | 4.917 | 34,821.87 |
| **2000** | 231.436 | 4.652 | 0.21497 | 95.38 | 1,128.783 | 1,076.577 | 32,352,977 | 2.70% | 5.771 | 34,889.62 |
| **2001** | 254.823 | 4.348 | 0.22997 | 97.78 | 1,133.170 | 1,108.048 | 31,129,298 | 2.52% | 4.313 | 36,402.05 |

| Year | M<br><br>M1+ Gross<br><br>$ billions | V<br>= Y/M<br><br>Income Velocity of M1+ Gross | k<br>=1/V<br><br>Cambridge cash balances | P<br><br>CPI 2002=100 | y<br>= Y/CPI<br><br>Real GDP: $ billions in 2002 dollars | GDP<br>= Y<br>Gross Domestic Product in $ billions at current market prices | Population<br><br>Canadian population in millions | Inflation:<br><br>Percent Change in CPI | Bank Rate<br><br>Bank Rate (percent) | Real GDP p.c.<br><br>Real GDP per capita in 2002 dollars |
|---|---|---|---|---|---|---|---|---|---|---|
| **2002** | 282.192 | 4.086 | 0.24477 | 100.00 | 1,152.905 | 1,152.905 | 31,446,719 | 2.27% | 2.708 | 36,662.17 |
| **2003** | 296.506 | 4.092 | 0.24440 | 102.75 | 1,180.706 | 1,213.175 | 31,734,093 | 2.75% | 3.188 | 37,206.22 |
| **2004** | 322.897 | 3.998 | 0.25013 | 104.66 | 1,233.452 | 1,290.906 | 32,038,401 | 1.86% | 2.500 | 38,499.17 |
| **2005** | 344.243 | 3.991 | 0.25057 | 106.98 | 1,284.267 | 1,373.845 | 32,352,977 | 2.21% | 2.917 | 39,695.49 |
| **2006** | 371.124 | 3.908 | 0.25588 | 109.12 | 1,329.220 | 1,450.405 | 32,690,242 | 2.00% | 4.313 | 40,661.06 |
| **2007** | 402.631 | 3.799 | 0.26323 | 111.45 | 1,372.444 | 1,529.589 | 33,048,782 | 2.14% | 4.604 | 41,527.83 |
| **2008** | 436.712 | 3.672 | 0.27236 | 114.09 | 1,405.373 | 1,603.418 | 33,448,916 | 2.37% | 3.208 | 42,015.50 |
| **2009** | 491.771 | 3.109 | 0.32163 | 114.43 | 1,336.140 | 1,528.985 | 33,856,945 | 0.30% | 0.650 | 39,464.28 |
| **2010** | 551.750 | 2.944 | 0.33962 | 116.47 | 1,394.908 | 1,624.608 | 34,254,344 | 1.78% | 0.850 | 40,722.09 |
| **2011** | 599.765 | 2.843 | 0.35173 | 119.86 | 1,422.668 | 1,705.181 | 34,605,346 | 2.91% | 1.250 | 41,111.22 |

Source:
CANSIM: The Canadian Socio-Economic Management System, from Statistics Canada: on the CHASS website http://dc.chass.utoronto.ca/