

Question Paper

Security Analysis – II (212) : July 2002

Part D : Case Study (50 Points)

- This part consists of questions with serial number 1 - 5.
- Answer all questions.
- Points are indicated against each question.
- Do not spend more than 80 - 90 minutes on Part D.

Case Study

Read the case carefully and answer the following questions:

1. Perform Michel Porter analysis of the Indian Tyre Industry.

(10 points)
2. Comment on the financial condition of Apollo tyres based on the financial statements and the ratios given in the case. Also comment on the leverage of the company if the contingent liabilities reported by the company turn out to be real long term liabilities.

(12 points)
3. Based on the information given in Annexure-I and the financial statements of Apollo Tyres, determine the required return on the share of Apollo Tyres, according to CAPM. Using the rate thus determined, calculate the perpetual dividend growth rate required by the company according to the dividend discount model to support its current stock price of Rs.75.

(12 points)
4. Comment on whether the signals given are for 'buy' or 'sell' based on the moving average and MACD charts given. (Refer to points A, B, C and D).

(8 points)
5. Apollo Tyres is planning for restructuring its operations. If undertaken, the restructuring may first reduce the EPS of the company to Rs.5.00 and force it to increase the dividend payout to 80%. However, subsequently, it enables the company to pay dividends that grow at 20% for the next 5 years, and decline to 10% over the 5 years after that. The dividend growth rate can then be expected to stabilize at 10% and remain at that level forever. The required rate of return of the stakeholders increases to 15% if the restructuring exercise is undertaken. Determine the impact of the restructuring on the share price of the company.

(8 points)

Indian Tyre Industry

Had it not been persistent efforts of Goodyear, Dunlop, Michelin, Seiberling and Goodrich, we might still be rattling around on rigid steel and wooden wheels. Their combined efforts have now grown into a \$70 bn global tyre industry. The industry has come a long way – both globally as well as domestically. In India, the tyre industry was born in 1926 with the establishment of the first tyre company – Dunlop Rubber Company. As the automobile sector began to take roots in the country, the tyre industry saw the entry of many players and concurrently grew until the late 70s. With waves of liberalization sweeping the land in 1992, the industry saw the entry of many global players as part of joint ventures.

Developments in the tyre industry have to be viewed from the perspective of its strong linkages with the performance of the agricultural and industrial sectors, overall exports, transportation and a multiplicity of other factors. As a result, tyre industry operates in an environment, which is dynamic and driven by the performance of other sectors. Performance of the segment is linked to that of automobile and surface transport sectors.

The above case is prepared only for the purpose of examination and not to illustrate either effective or ineffective performance of the company. The case contains real information adapted and combined with other information to generate discussion or analysis on the desired topics.

PRODUCTS AND PROCESSES

Tyres made in India can be broadly classified as crossply and radial. Crossply tyres account for 90-95% of tyres sold in India. The body of the tyre called the carcass is made up of layers of rubber coated nylon or rayon fabric called piles. The main difference between these two tyres is the direction in which ply cords are arranged and the type of reinforcement medium used. In a crossply tyre, the fabric cords of the tyre criss cross each other and the major reinforcing materials used are rayon and nylon tyre cords. Radial tyres have more flexible sidewalls and the reinforcing medium include polyester, nylon, fiberglass and steel. As such, there is a substantial price difference between crossply and radial tyres. Radial tyres are 10-15% costlier compared to the crossply ones. Radial tyres can be differentiated on the type of belt used – fiberglass, steel and nylon. Worldwide, steel belted radials are most popular owing to their superior performance. Radial tyres provide certain advantages like better vehicle control and road holding, longer life and lower fuel consumption.

Radialisation in India

Rate of radialisation is actually an index of the status of road development, vehicle engineering and the economy in general. Radialisation can be aptly classified as the most important innovation in tyre technology. Despite its several advantages cited above, radialisation in India did not catch on at a pace that was expected, since its introduction way back in 1978. This could be attributed due to several factors, viz. Indian roads generally not being suitable for ideal plying of radial tyres; vehicles produced in India not having suitable geometry for fitment of radial tyres (and hence the general, and wrong, perception that radial tyres are not required for Indian vehicle); unwillingness of consumer to pay higher price for radial tyres etc.

However, the situation has radically changed in recent years, especially for the passenger car tyre segment where estimated production of cross ply and radial passenger car tyres has been in the ratio 37:63 in FY01. A few years back a beginning was made in radialisation of truck and bus and LCV tyres and this process is gaining momentum. Radialisation is expected to reach 10-13% in this segment in two years.

Retreading

Retreading is a process of bonding a new flap of pre-vulcanized rubber in place of the worn-out flap. This can be done either by the conventional hot process or the new precured cold process. While the tread is done after bonding the flap in the hot process, the cold process involves the bonding of a precured traded rubber flap on the tyre surface. The precured process improves the fuel efficiency.

According to a study, retreading has eaten 10% of the replacement market tyre sales. The popularity of retreading stems from the fact that it costs only 20 per cent of a new tyre but increases its life by 70 per cent to 80 per cent. Most of the transporters in India retread their tyres twice during its lifetime, while a few fleet owners even retread thrice. In their zealouslyness to economise costs, they overlook the reality that retreading reduces the quality of the tyre. It is highly popular in the South unlike in the North where the transporters overload their trucks and have to ply their vehicles in a rough terrain an environment in which buying a new tyre is the best option. Though retreading has penetrated 25 per cent of the tyre market, it has not made much of a dent in the rapidly growing two-wheeler and passenger car segments.

RAW MATERIALS

The tyre industry is raw material intensive, which accounts for more than 60% of the production cost. Therefore, prices of raw materials directly affect the profitability of tyre companies. Since most of these raw materials are petroleum based, their prices fluctuate with the international prices of petroleum products. The main raw materials for tyre are rubber (natural or synthetic), carbon black, nylon tyre cord and rubber chemicals. Except natural rubber, the costs of all other raw materials in tyre production are related to crude oil prices.

Natural Rubber

Natural rubber accounts for 52% of the value of the tyre. In India, mixture of both natural as well as synthetic rubber is used for making tyres. However the consumption ratio is towards higher usage of natural rubber due to Indian climatic conditions, over loading of vehicles and poor road condition. In India the consumption of natural to synthetic rubber is 80:20 which is in stark contrast to international ratio. The industry uses RSS – 4 grade rubber.

India's 90% of the rubber production comes from Kerala. Domestic rubber production has increased at a compounded growth rate of 9% annually from 1991 to 1997 after which the production slowed down. However In FY 2001, rubber production soared and crossed double-digit mark at 10.2%.

Synthetic Rubber

Synthetic rubber is generally of two types – poly-butadiene rubber (PBR) which forms 40% of the synthetic rubber used in tyres. The other variety is Styrene Butadiene Rubber (SBR) primarily used in passenger car radials to give the grip to the tyres. At present, IPCL is the only domestic producer of PBR. However it is able to meet only 44% of the tyre industry's requirement. Thus India is a significant importer of synthetic rubber. There is an urgent need to increase production capacity of SBR to supplement natural rubber.

Carbon Black

Carbon black is a key raw material used in the manufacture of automotive tyres. More than 70 per cent of the demand for carbon black is from the tyres segment. Carbon black feed stock (CBFS) is the key raw material used to manufacture carbon black. Roughly 2.2 tonnes of CBFS is required to produce one tonne of carbon black. Its main use is as a reinforcing agent in tyres.

Though there are more than twenty types of CB, the ones used for tyre production are mainly of three types, N220, N330 and N660. N660 is mainly used in the carcass of the tyres, N330 is used for the tread and N220 is used for the tread of heavy-duty tyres. On an average, about 45% of the CB consumed by the tyre industry is of the N660 variety, 28% of N220 and 27% of N330 variety.

Truck tyres consume 20 kgs of CB per tyre, while smaller tyres like Maruti consume 1.5 kgs. Overall approximately 60 – 65% of the CB produced in India is consumed by the tyre industry. Indian market is dominated by the top three players in the industry -- Philips Carbon Black, Hitech Carbon (unit of Indian Rayon) and Cabot India (a subsidiary of Cabot Corporation, US).

Nylon Tyre Cord

This is mainly a reinforcing material and lends strength and tenacity to the tyre. It is placed below the tyre tread, in contact with the road. Almost 90% of nylon cord manufactured in India is consumed by the industry. The tyre cord price fluctuates in consonance with the prices of caprolactum, its main input.

Rubber industry in post GATT era

With the lifting of physical barriers on imports of all commodities by April 2001, and also phasing out of various subsidies for exports, the rubber industry is in for a very rough tide. With the slowdown in economy compounding the problem, the automobile majors are in for a major shake-out.

DEMAND DETERMINANTS

- General Economic Scenario:** In FY 01 the revised GDP growth was less than the forecasted GDP growth. As GDP is a reflector of the purchasing power of consumers, low GDP apparently hinders progress of manufacturing industries. Consumers tend to defer their investments.
Original Equipment Manufacturers (OEMs) are under pressure and so are the replacement markets, because there is little fleet utilization and hence less replacements.
Though FY02 is also forecasted to be lackluster one, but it is predicted that it will still be better than FY01.
- Growth of Automobile Industry:** Tyre is a demand-derived product. Its fortunes are closely linked with the automobile segment as can be seen from the 95.5% correlation coefficient between the sales of vehicles and tyres. Therefore the growth or fall of automobile sector is reflected in growth or fall of tyre industry. In FY01, tyre production went up by mere 2.6%yoy on the back of sluggish demand in the automobile sector.
The whole tyre market is dominated by the truck/bus segment, which formed 20.3% of total production volumes in FY01 (21.7% in FY00). This figure has dropped from a high of 28% in FY95 as the segment faced sluggish conditions since FY98. The truck/bus tyre recorded a negative growth of 4%.
On the other hand, sales in the motorcycle segment have grown robustly since FY95 on the back of increasing demand for motorcycles (20% yoy in FY01) from amongst others in the two-wheeler segment.
- Fluctuations in Raw Material Prices:** Prices of natural rubber, carbon black and the nylon tyre cord directly affect the prices of the tyre since these inputs constitute 60% of the total cost. Variable cost is very high leading to thin profit margins. The price of RSS-4 variety of natural rubber remained lower as compared to previous year during most of the year.
- Relative Importance of Road Transport:** With the share of railways in carrying freight coming down over the past few years, this has led to a higher demand for road transport. Thus, increased usage of commercial vehicles should translate into more demand for tyres. Also, the poor road conditions in most parts of the country and overloading of vehicles would require superior quality tyres.
- Retreading:** Retreading a tyre costs around 20% of the price of a new tyre. It is more prevalent in truck and bus segments due to their high prices. A tyre can be retreaded at least 3 times. According to some estimates, retreading has reduced demand in the replacement market by around 10%. As technology for retreading improves, it could act as a dampener to growth in replacement market.
- Radialisation:** In FY01, 63% of passenger car tyres produced in India were radials and the industry is further expecting radialisation in this segment to over 70% in the coming two years. While in the commercial vehicles segment they are expecting 13-15% radialisation by that time.

Peculiar Features of the Tyre Industry

- High Capital Cost:** The sector is capital intensive. A 1.5mn tyre per annum radial tyre plant costs Rs.8 bn, while a 1.5mn crossply tyre would cost Rs.4-5 bn.

2. **Distribution Network:** With typically higher margins in the replacement market, companies need to invest in brand building and distribution network. A nationwide distribution network and strong brand recalls are factors critical to tyre sales. Domestic companies enjoy the advantage of an existing distribution network. Thus new entrants will have to spend higher on marketing, distribution and advertising to maintain brand visibility among foreign majors.
3. **Cyclical Nature:** Due to high minimum economic size, demand supply mismatches constantly exist. Tyre industry has a derived demand due to dependence on a cyclical auto industry. Prices of petrochemical-based raw material and natural rubber also tend to be cyclical.
4. **Technology Intensive:** Tyre manufacturing involves sophisticated technology and now with the advent radial tyres, technology has assumed importance in tyre manufacture. Global spending on R&D is higher (more than Rs10 bn per annum by each major producer). All foreign cars introduced in India are launched on radial tyres. Tyre technology is moving fast. There is more and more emphasis on creating environment friendly tyres that will be easily disposable with minimum pollution.

The new Goodyear GT3 is the first tyre on the market using a new starch-based filler material called BioTRED, which uses common corn as its "feedstock." The tyre is more environment friendly as it uses less of carbon black and silica.

MARKET SIZE AND GROWTH

The Indian tyre industry is worth about Rs.98 bn in terms of value in FY01. In terms of volumes, the industry produced 42.47mn units of tyres in FY01, at a CAGR of 9% in the last decade. The table below indicates the production figures for the tyre industry vis a vis the production trend in the automobile industry. As expected, the two streams of data have a high coefficient of correlation of about 95%.

Table 1: Production Volumes

Year	Tyres (mn nos.)	Auto (mn nos.)
FY98	34.2	4.26
FY99	37.56	4.477
FY2000	42.14	5.098
FY2001	42.47	4.996
CAGR	9.00%	—

Source: SIAM and ATMA

Two-Wheelers

Production of two-wheeler tyres has also followed the general trend of two-wheeler sales. If we take the scooter segment, for e.g. production of scooter tyres have declined at 3.26% CAGR between FY96 and FY01, which is mostly in line with the total scooter production decline at a rate of 8.06% CAGR in the same period. In the motorcycle tyre segment, the growth rate has been a healthy 22.65% CAGR matching, that of motorcycle sales, that grew by 22.07% per annum. Production of moped tyres has shown some interesting movements. It has dropped by a sharp 14.55% per annum since FY97. Production suddenly dropped by more than half in FY98 and has continued to further decline in FY01, when the production of mopeds dropped 76.9%.

Cars

Production of passenger car tyres has more or less followed the general trend of the particular segment.

Tractors

Production of tractor tyres has also followed the general trend of the particular segment. However, production of tractor front tyres has grown at a smaller rate as that of the tractor segment. On the other hand, production of trailer tyres has been consistently falling since FY97 when it sharply dropped by half to 0.36mn tyres as compared to FY96. Production of rear tyres has grown at a CAGR of 4.67% since FY96 while front tyres have done so at a CAGR of 3.50%.

The negative trend in production of trailer tyres can be explained by the fact that trailer tyres mostly sell in the replacement market. Trailers do not essentially come along with a tractor. Farmers attach a trailer to a tractor for transporting goods to the market or for other such uses. Hence, there cannot be a link between tractor production and trailer tyre production. The low CAGR growth in case of tractor front tyres could also be explained by the fact that around 45-50% of supply is to the replacement market, which could be used for driving other kinds of vehicles (may be animal drawn ones).

HCVs (Truck and Bus)

Production of HCVs tyres has not followed the general trend of production of HCVs. For e.g., in the year FY01 when the HCV segment was going through one of its worst recessionary periods, tyre production fell only marginally. This could be attributed to the rise in exports by 6.42%yoy to 1.743mn during the year.

LCVs

Production of LCV tyres has not followed the general trend of production of LCVs. In fact it is stark opposite to the trend. While production of LCVs has fallen by 10.94% CAGR since FY97, production of LCV tyres has grown at a CAGR of 13.82%. The answer, perhaps, lies if one takes a closer look at the performance in the export market of LCV tyres. Exports rose sharply by 63%yoy to 158,180 units in FY97 after falling for the past three years. In FY98, exports more than doubled to 337,865 units. In FY99, it dropped to around 0.3mn units, which is also reflected in the marginal drop in tyre production. In FY01, exports again rose to 16.7%.

Segmentation

The tyre industry caters to three types of markets – original equipment manufacturers (OEMs), replacement and export markets.

The tyre demand from the OEM segment is a function of automobile production. The volumes depend on whether the manufacturer has a tie up with any OEMs like Maruti, Telco, Mahindra & Mahindra etc. Margins are lower in this business and suppliers concentrate on volumes to spread out overheads.

The exports share has grown for all types of tyres except scooters. Exports have grown from 18.3% to 20.2% for truck tyres, from 0.47% to 1.26% for passenger car tyres, from 18.3% to 20.1% for LCV tyres and from 0.21% to 0.31% for motorcycle tyres.

The replacement market for passenger cars, scooters and mopeds appear to be significant. The replacement market share for passenger car tyres rose from 51.6% in FY 00 to 61.5% in FY 01. Similarly in the case of scooters, percentage sales to replacement market increased from 56.1% to nearly 65.1%. The OEM market for truck and bus tyres has fallen due to ongoing recession. Percentage supplies to the government and state transport undertakings have remained more or less stagnant in FY01 as compared to FY00.

Replacement Market

The demand from the replacement market flows from the vehicles sold in the earlier years. Apart from that, the economic-cum-industrial growth is the other key demand determinant. The market accounts for 61.4% of the total tyre consumption in FY01 and 65.5% of total truck tyre demand. In FY00, the replacement market accounted for 57.8% of the total market. The increase in the last year could be explained by the fact that OEM supplies to the truck and bus, passenger car, LCVs and scooter segments have decreased on the back of lower production. Margins are better in this segment as the prices are 10-15% higher than the OE segment. This segment is affected by retreading which involves laying of new threads on a worn out tyre to increase its life.

Export Market

In the light of the prevailing domestic market situation, all the major players have taken to exports to reduce inventory build-ups. Average annual compound growth rate during last one decade was 19%. There have been sustained exports for over a decade to more than 50 countries. All large tyre companies are exporting with over 30% exports to US. More than 20% of total Truck & Bus tyres produced domestically are exported. Indian cross ply tyres have excellent acceptance in developed countries. All large tyre companies are engaged in sustained exports as a long-term commitment.

The bulk of the exports are the older cross ply technology tyres catering to the replacement market of older vehicles abroad. Truck and bus tyres account for around 72.5% of the tyres exported followed by LCVs with 17.6%. The world export market for tyres is estimated at US\$ 10 billion, indicating that significant potential exists for Indian companies to increase their exports.

However most of these export markets are already being catered to by global tyre manufacturing giants. Therefore, though export potential exists, it is limited to geographical areas not serviced by the global majors. However the large replacement market for older cross ply tyres will continue to be the main target market for Indian exporters in the near term.

The basic problem is that the tyre manufacturers never showed any interest in serious exports. They felt that export was an activity to be taken up during times of recession in the local market. Exports require drive from the management with an ambition to become a global player. They also require keeping abreast of changes in technology and methodology adopted by tyre manufacturers overseas so that the Indian companies can leverage their strengths.

The Indian tyre industry has exported 2,404,304 units in FY01 up by 10.9% as compared to FY00. America continues to be the largest market for the tyres exported from India. India exported 20.2% of the bus and truck tyres produced in the country. With the domestic demand continuing to be far less than the supplies, the companies should focus more on exports. In exports the margins are always less and therefore the volumes must be hiked to earn more. The companies should focus on increasing the volume of exports to both traditional markets as well as new ones so as to earn the maximum revenue from exports. New markets such as South America and Vietnam hold very good promise. Indian tyres can also make roads in Brazil where the road conditions are same as in India.

India's tyre exports, however, forms less than 1% of the world market size of 1.6 bn units. Globally, major tyre companies have phased out manufacturing of cross ply tyres. Low labor costs, technology and improving economies make Indian manufacturers competitive in cross ply tyres. Huge over capacity forced the domestic manufacturers to tap the export market in cross ply tyres. Tyres are exported at one-third the price because raw materials are imported duty free and there is no duty on tyre exports.

OUTLOOK

The tyre industry recorded near stagnant performance in FY01 in line with the decline in the automobile sector. The market weakness witnessed in the FY01 is forecast to continue well into this year, and passenger car sales are forecast to drop by 10% for the year as a whole. With GDP growth undermined by lacklustre consumer confidence, and thus lower spending, due to higher energy costs, it is expected that the passenger car volumes achieved last year cannot be sustained. The commercial vehicle segment is expected to be more resilient this year, however, mainly because the light segments are expected to bounce off the already very depressed levels.

New models will stimulate demand for utility vehicles, and this segment is expected to outperform in the medium term. For the heavy truck segment, a further year of decline is expected before a more sustained recovery takes place from 2002. Consumer and business confidence will improve progressively throughout the year, as the domestic inflationary factors are worked through and as the global economic environment improves. It is expected that all vehicle segments start a sustained growth cycle from next year, with new record volumes sold each year to 2005.

As expected, FY02 has started on a dull note, with no signs of dramatic recovery. In the first two months of the year, production continued to decline. This could be attributed to stagnant production of truck and bus tyres and a sharp fall in the production of tractor and scooter tyres. With prediction of good monsoons, the situation is likely to be bettered for commercial vehicles.

Also the fact that prices of major inputs like nylon tyre cord fabric and carbon black have firmed up in the past year has meant that operating margins of tyre companies are under pressure. Average natural rubber (RSS-4) prices during the FY02 are expected to be higher than in the FY2001.

Prices had already risen by 3% on an average in FY01 as compared to FY00. Recent trends suggest a fall in rubber production in the country. Rubber is the main raw material for tyres and as long as prices remain firm, margins for the tyre industry will remain unaffected. The prices of nylon tyre cord fabric and carbon black have risen in the past six months due to a sharp rise in petroleum prices during the period. The operating margins as a result have been badly affected.

With the lifting of quantitative restrictions, China and Taiwan may emerge as strong competitors in both domestic as well as international markets. China has an advantage in terms of lower prices. Chinese tyres are cheaper by as much as 25%. On the other hand, Indian tyres are considered to be of better quality than Chinese tyres and command a premium of around \$5 in the US market. But this advantage may not last for long as the Chinese are said to be catching up. In the longer run, Indian companies will have to do with a larger international presence in the domestic market.

Import Duty Anomaly

One worrying thing for the tyre producers is the anomaly in the import tariff regime in India. Tyre imports were liberalized in the recent past and brought under OGL. Tyres attract an import tariff of 35% while that from South Korea enjoys a concession of 5% under the Bangkok Agreement, 1976, wherein member country including India have been levying concessional import duty on various items imported from other countries. This has put Indian tyre industry at a disadvantage as the major raw material used by such industry i.e. synthetic rubber and nylon tyre cord fabric; the effective import duty is 16%.

At the time agreement was signed the economic development of both India and South Korea was almost the same. Further, at that time Import duty on tyre was over 150% and tyres came under restricted list of import. Hence, the concession had no practical adverse impact on Indian tyre industry. But now the position has changed. With free imports of tyres allowed under the Exim Policy, import of tyres has gone up manifold. Most of the imports are from South Korea at concessional rate. Thus, Indian industry is facing a serious threat of large-scale cheaper imports/ dumping of tyres from South Korea. Import duty on tyres has been reduced from 80% – 100% prevailing in 1991 to 35% in 2000. Once the anti-dumping duty is reduced the same would be in line with the proposition made below that import duty on raw materials should be lower than import duty on tyres, the ideal difference being 10%.

Key raw material inputs like nylon tyre cord, carbon black and synthetic rubber also attract the same duty of close to 40% as on the finished product. Added to this, there is an anti-dumping duty recommended for nylon cord and synthetic butadiene rubber. As a result of this situation, imports from South Korea are picking up and this could put pressure on margins. ATMA has suggested that this anomaly be removed and raw material inputs charged a lower import tariff than finished items. The bulk of imports to India were of passenger car radials from

South Korea. As India still lacks enough capacities for producing radial tyres, cheaper imports could adversely affect the local players if the present tariff structure continues.

APOLLO TYRES LTD (ATL)

ATL has grown rapidly in the last decade, and from being a marginal player, it has raced ahead to become the third largest player in the tyre industry. ATL management has been quick to spot opportunities and has displayed remarkable market savvy. In FY2000, ATL has tied up with Castrol Ltd and Kotak Mahindra Finance Ltd to provide multiple product opportunities to its exclusive dealers. The management has not been found wanting when it comes to introducing new products to tap growing segments in the auto industry.

Background

ATL, is the flagship of the Apollo group. It was formed in 1972, by BST Manufacturers Ltd, with Raunaq Singh as the founder chairman. Post restructuring in the group, the management of the company has been handed over to Raunaq Singh's son Onkar S Kanwar. Operations began in 1977, with the setting up of a plant to manufacture truck and tractor rear tyres at an annual capacity of 0.42mn tyres. The plant set up at Perembara in Kerala, was with technical collaboration of General Tires International Company, USA. The Kerala plant has been besieged by labor problems in the past. In August/September 95, the plant had to be shut down for a period of two weeks following go-slow tactics and disruptive actions by workers. In FY99 too, the plant faced labor unrest for a prolonged period. To reduce dependence on a single plant, ATL put up its second plant at Baroda, Gujarat in 1991 at an annual capacity of 0.68mn tyres. ATL is entitled to certain fiscal benefits till the year 2005 on its Baroda plant. In February 2000, Continental AG of Germany picked up 15% stake in the company.

ATL manufactures automobile tyres, tubes & flaps and is well placed in the T&B (truck and bus) tyre replacement segment, which comprises around 65% of the market. It had a capacity of 2.85mn tyres per annum in FY2000, up from 2.44mn in FY99. It also sources tyres from S Kumar, Stallion, TCI etc and markets them under its own brand name.

Automobile tyres

Automobile tyres contributed to 90.6% of the sales turnover in FY2000. ATL manufactures truck & bus tyres, tractor rear tyres, passenger car tyres, tyres for animal drawn vehicles (ADV) & off the road (OTR) vehicles. The company's prime area of focus is the replacement market of the truck & bus tyre segment. In the replacement market, the company has a share of around 20%. ATL is also keen to target the OEM market and it has succeeded in becoming a supplier to Ashok Leyland. Truck & bus tyres account for more than 50% of its sales in volume terms (numbers) and around 75% in value terms. For tractor tyres, the respective numbers are roughly 10% and 20%. For scooter tyres, it is 26% and 4%. In FY99, the company has introduced a new tyre for two wheeler scooters under the brand name "Black Cat Ultra" with anti-skid technology. Given the growth rates in this segment, ATL has set up facilities to manufacture radial tyres in Baroda. In FY2000, the company even reduced its radial tyre prices by 25% which would help it to gain some market share. Total tyre production in FY2000 was 2.78mn nos as compared to 2.33mn tyres in FY99.

Automobile tubes and flaps

Sales of automobile tubes constitute around 7.7% of the total turnover in FY2000. Flaps brought about the rear with about 1.8% of the turnover. ATL has a capacity to manufacture 2.986mn tubes and 51,750 nos of flaps as in FY2000. ATL's plant at Pune, which is the largest single location tube and flaps manufacturing unit, started commercial production in April 1996. The entire production was captively consumed and outsourcing of tubes came down steadily over the years. On the other hand, the licensed capacity for manufacturing flaps went down significantly while outsourcing was increased. Production during FY2000 touched 2.79mn nos of tubes and 1.45mn nos of flaps.

Exports

Stiff competition from cheaper Chinese and Korean tyre manufacturers and a trend towards increased radialization affected ATL's prospects in the export market. Moreover, gross profit margins were under pressure due to fall in international prices and sluggish demand of tyres worldwide. However, despite all this, ATL managed to register positive export growth during the year. Apollo International, the exporting arm of ATL, exported tyres worth Rs1.36 bn as compared to Rs1.27 bn in FY99. The company has come to capture a share of 17.6% in the total tyre exports from the country. ATL continues to be the top three tyre companies in the African continent with significant presence in countries like Egypt, Tanzania, Kenya etc.

Expansion plans

During the year, the company has successfully implemented a project to manufacture 2,000 radial tyres per day for passenger cars at its Vadodara plant. Further, a capacity of around 50,000 two/three wheeler tyres per month has been created where tyres will be manufactured under the Apollo brand name. The company plans to set up a new manufacturing facility of 100 tons per day capacity for producing cross ply/radial truck and bus tyres. The capital outlay will be of the order of Rs.4.5 bn.

Outlook

The outlook for the company largely depends on the prospects for the auto industry as a whole. A positive outlook for the automobile sector in the rest of fiscal 2000 augurs well for the tyre sector. ATL's competitive position in the industry is good. With a wide product range, large distribution network and well-established brands, it is expected to retain its market leadership. It's increased focus on the OEM truck and tyre segment is also welcome. The commercial vehicle segment is expected to grow by 15%-20%. The tie-up with Continental Tyres of Germany, the fourth largest player in the world, will give the requisite leverage to take on the competition from Bridgestone and Goodyear. Moreover, this development would bring in the requisite funds required for ATL's capex needs. However, uncertain industrial relations may act as a damper. Secondly, high prices of raw material inputs like carbon black, nylon tyre cord and natural rubber will keep pressure on margins.

Earning drivers

Raw material price fluctuations: Excepting for prices of natural rubber, an agricultural commodity, other raw materials are mainly petrochemical based and price movements are cyclical.

Freeing imports of radial tyres will affect margins in that segment.

Profit & loss account (Rs mn)

Period ended	03/98	03/99	03/00	03/01
No. of months	12	12	12	12
Gross Sales	13,651.9	11,511.6	13,487.5	14,547.0
Excise Duty	(2,928.0)	(2,512.0)	(2,818.7)	(3,125.9)
Net sales	10,723.9	8,999.6	10,668.8	11,421.1
Other income	40.5	28.6	200.0	40.0
Total income	10,764.4	9,028.2	10,868.8	11,461.1
Raw materials	6,210.1	5,322.2	5,800.1	6,994.9
Stock adjustment (Inc)/ Dec	394.5	(430.4)	192.9	(162.9)
Cost of material	6,604.6	4,891.8	5,993.0	6,832.0
Employee cost	705.1	689.4	781.5	934.2
Power & fuel	535.6	486.1	575.1	677.7
Advertising/ promotion/ public	143.4	107.0	267.1	185.5
Freight & forwarding	214.0	266.9	285.2	331.2
Other expenses	1,084.6	1,244.1	1,346.9	1,362.2
Cost of sales	9,287.3	7,685.3	9,248.8	10,322.8
PBIDT	1,477.1	1,342.9	1,620.0	1,138.3
Interest & finance charges	637.5	589.7	413.4	574.6
PBDT	839.6	753.2	1,206.6	563.7
Depreciation	220.9	234.6	266.0	308.8
PBT	618.7	518.6	940.6	254.9
Provision for taxation	137.6	118.4	180.0	0.7
Extraordinary items/ Prior year adj.	(74.3)	(89.4)	-	-
Adjusted PAT	406.8	310.8	760.6	254.2
Dividend payout	131.8	140.5	192.7	160.1
Forex inflow	-	-	79.5	142.8
Forex outflow	1,636.5	1,340.3	1,463.5	1,911.4
Book value of quoted investments	170.6	170.6	170.6	124.0
Market value of quoted investments	155.9	104.3	82.9	83.2
Contingent liabilities	1,280.1	812.7	802.9	858.2

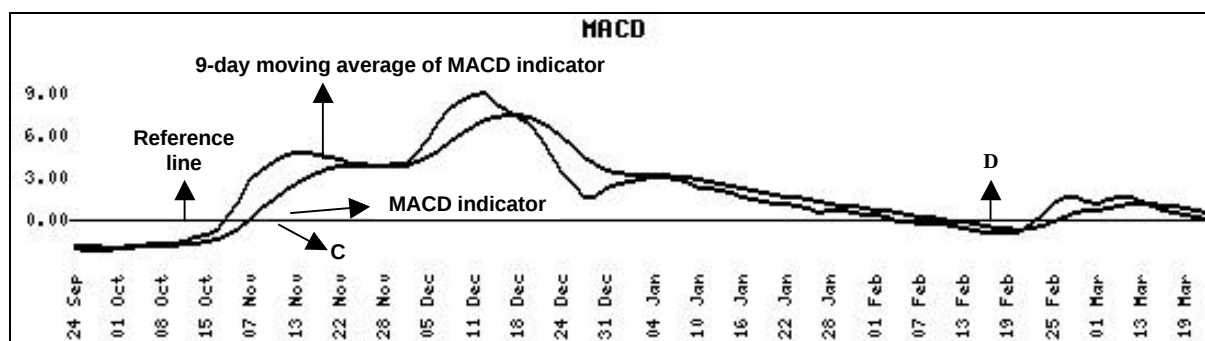
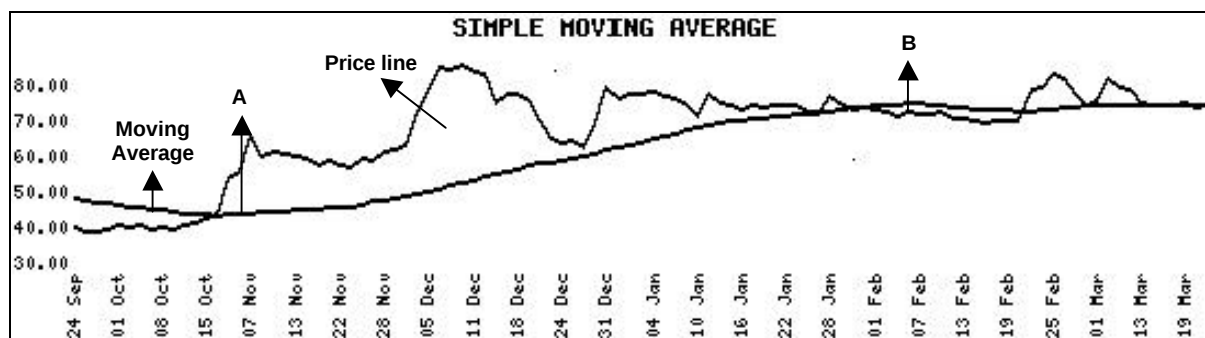
Period ended	03/98	03/99	03/00	03/01
RATIOS				
As % of net sales				
Gross sales	127.3	127.9	126.4	127.4
Excise duty	(27.3)	(27.9)	(26.4)	(27.4)
Net sales	100.0	100.0	100.0	100.0
Other income	0.4	0.3	1.9	0.4
Total income	100.4	100.3	101.9	100.4
Cost of material	61.6	54.4	56.2	59.8
Employee costs	6.6	7.7	7.3	8.2
Selling expense	3.3	4.2	5.2	4.5
Other expenses	10.1	13.8	12.6	11.9
Cost of sales	86.6	85.4	86.7	90.4
Profitability ratios (%)				
PBIDT excl. other income	13.4	14.6	13.3	9.6
PBIDT	13.8	14.9	15.2	10.0
PBDT	7.8	8.4	11.3	4.9
Profit before tax	5.8	5.8	8.8	2.2
Profit after tax	3.8	3.5	7.1	2.2
Growth ratios (% yoy)				
Net sales	(1.6)	(16.1)	18.5	7.1
PBIDT	8.9	(9.1)	20.6	(29.7)
PBT	47.6	(16.2)	81.4	(72.9)
PAT	12.0	(23.6)	144.7	(66.6)
Payout ratios (%)				
Tax (% of PBT)	22.2	22.8	19.1	0.3
Dividend (% of PAT)	32.4	45.2	25.3	63.0

Balance sheet (Rs mn)

Period ended	03/98	03/99	03/00	03/01
No. of months	12	12	12	12
SOURCES OF FUNDS				
Equity capital	300.5	330.6	363.2	363.2
Share premium account	669.5	903.6	1,195.7	1,195.7
Revaluation reserve	82.1	72.6	63.9	55.2
Profit & Loss/ General reserve	1,120.9	1,323.4	1,740.1	1,895.7
Other reserves	552.0	519.8	671.0	562.9
Reserves and surplus	2,424.5	2,819.4	3,670.7	3,709.5
Net worth	2,725.0	3,150.0	4,033.9	4,072.7
Secured loans	2,528.3	2,572.1	2,532.6	2,143.8
Unsecured loans	420.3	367.9	820.3	1,622.6
Total debt	2,948.6	2,940.0	3,352.9	3,766.4
Capital employed	5,673.6	6,090.0	7,386.8	7,839.1
APPLICATION OF FUNDS				
Gross block	4,548.9	4,973.0	6,003.9	6,480.9
Accumulated depreciation	(1,508.4)	(1,730.3)	(1,989.1)	(2,257.7)
Capital work in progress	46.8	337.2	157.8	75.3
Total fixed assets	3,087.3	3,579.9	4,172.6	4,298.5
Investments	275.6	275.9	773.1	642.8
Inventories	975.9	1,537.6	1,850.1	2,125.8
Sundry debtors	2,529.4	1,319.8	1,385.6	1,757.6
Cash & bank balance	384.3	573.7	448.3	562.8
Total loans & advances	511.6	468.6	949.5	1,011.6
Sundry creditors/ Acceptances	(2,159.5)	(1,806.3)	(2,378.5)	(2,639.9)
Other liabilities	(37.8)	(28.6)	(41.0)	(39.4)
Provisions	(90.6)	(23.9)	84.5	(28.1)
Net current assets	2,113.3	2,040.9	2,298.5	2,750.4
Miscellaneous expenses	197.4	193.3	142.6	147.4
Capital deployed	5,673.6	6,090.0	7,386.8	7,839.1
RATIOS				
Turnover ratios (x)				
Net sales to total assets	1.9	1.5	1.4	1.5
Net sales to fixed assets	3.5	2.5	2.6	2.7
Net sales to working capital	5.1	4.4	4.6	4.2
Net sales to inventory	11.0	5.9	5.8	5.4
Gross sales to debtors	5.4	8.7	9.7	8.3
Liquidity ratios (x)				
Current ratio	1.9	2.1	2.0	2.0
Debt equity ratio	1.1	0.9	0.8	0.9
Interest cover	2.3	2.3	3.9	2.0
Return on (%)				
Networth (post tax)	14.9	9.9	18.9	6.2
Capital employed (pre tax)	22.1	18.2	18.3	10.6
Per share (Rs)				
Net earnings (EPS)	13.5	9.4	20.9	7.0
Cash earnings (CPS)	20.9	16.5	28.3	15.5
Dividend payout	4.4	4.2	5.3	4.4
Book value (NAV)	90.7	95.3	111.1	112.1
Asset composition (%)				
Net fixed assets	56.4	60.7	57.6	55.9
Working capital	38.6	34.6	31.7	35.8

Annexure I

Technical Analysis Charts



Beta Vs. Expected Return

Beta	Expected Return
0.25	0.095
0.50	0.109
0.75	0.115
1.00	0.125
1.25	0.139
1.50	0.145
1.75	0.160
2.00	0.175

Movement of Stock Price and the Market

Date	Stock price of Apollo Tyres (Rs.)	S&P CNX 500
January 01, 1999	65.90	787.15
June 30, 1999	60.60	806.10
January 03, 2000	170.80	1291.55
June 30, 2000	94.65	1073.20
January 01, 2001	88.25	907.75
June 29, 2001	59.40	717.45
January 01, 2002	76.60	698.90

END OF PART D

Part E : Caselets (50 Points)

- This part consists of questions with serial number 6 - 12.
- Answer **all** questions.
- Points are indicated against each question.
- Do not spend more than 80 - 90 minutes on Part E.

Caselet 1

Read the following caselet carefully and answer the following questions:

6. According to the caselet, the free-float methodology helps in reducing the impact costs of fund managers. Explain how it helps. Identify with justification one more factor that adds to impact costs.

(7 points)
7. Assume that Bombay Stock Exchange adopts free float based indices. What should be done by the BSE if there is a major shift in a company's free float which belongs to the index? What could be the implications of the changes in floating stocks to institutional investors?

(7 points)
8. What do you think would be the impact of changing the indices to free float on the prices of shares that are not included in indices but have a large free float?

(7 points)

The Indian bourses are debating whether to shift the index calculation methodology from market capitalization to the internationally popular free-float method.

With the visit of FTSE Chief Executive Mike Makepeace to Mumbai to attend the round table conference on free-float, the debate on whether the Bombay Stock Exchange (BSE) should adopt this methodology of index construction is gaining momentum.

Why is the BSE thinking of this change when its indices are widely accepted by the market players? The answer is not too far to see. Globally, the concept of free-float methodology for calculating the index weights has become popular among major stock exchanges. FTSE has already adjusted all companies in its indices to the free-float from June 2001. MSCI would fully move to free-float by June 2002. Others like IBEX, AEX, BEL, DAX, CAC are seriously considering the free-float. Even in India, the free-float methodology has been used earlier in the construction of BSE-TECK, an index for technology, entertainment, communication and other knowledge-based sectors. It was launched on July 11, 2001, and was appreciated by all the market participants.

Dow Jones Indexes and Stoxx Ltd. were the first of the major index providers to move to free-float. The Dow Jones Global Titans 50 index was launched as a free-float index on June 18, 2000. The entire Dow Jones Global Index family including the pan-European Dow Jones Stoxx indexes moved to free-float capitalization on September 18, 2000.

Why free-float?

The transparent practices of the free-float methodology with ready availability and accessibility to data, the need to share the data and a strong feeling that this methodology is superior to other methods seem to have prompted global players to shift to this mode of index calculations. Mike Petronella, Managing Director, Dow Jones Indexes says, "As a modern index provider, we try to employ the best methodologies. We see ourselves as an innovator and are always looking for new trends in our industry. The time was right to make the change to free-float because the necessary ownership data was more readily accessible. Our efforts and the efforts of others for transparency of ownership data were responded to positively by those who control the data. The "democratization" of the ownership data was the key to implementing free-float. We always considered free-float market capitalization for indexes to be superior to full market capitalization."

Free-float is essentially the percentage of shares that is freely available for purchase on the markets. Therefore, free-float excludes strategic investments in a company such as stake held by government, controlling shareholders and their families, the company's management and restricted shares due to IPO regulations or shares locked under employee stock ownership plan. Foreign ownership related limitation imposed by the Government and the company is also taken into account.

A low free-float lends itself to volatility and manipulation and rise in the price of the illiquid stocks (due to large promoter holding) which can cause the indices to move equally sharply. The volatility in the BSE Indices can be

compared with those of the indices in the West where the free-float adjustment factor of most companies is near to 1. This would show that the Indian indices are more volatile. Low free-float can also give rise to price manipulation where a group of investors or even a single speculator can move the prices. The saga of the K-10 stocks was scripted by a single individual who could manipulate the share prices.

Therefore, basing an index purely on free-float removes this anomaly to a large extent and reflects the underlying market movement in a better way. Also, companies with a low floating stock which may be leaders in their respective industries can be included in a free-float based index whereas there may be a hesitation to include them based on market cap method.

All the market players especially the fund managers have accepted free-float. If a company in the index is closely held and has a low floating stock the fund managers would have to pay high impact cost to replicate the index. In the free-float methodology, closely held companies would have a much lower weightage and hence the impact cost would be much lower. It is also easier to replicate by passive fund managers. The index providers agree that this methodology is what the market players need. Petronella says, "The market has accepted our free-float approach very well because it is based on the needs of the marketplace. Managers who use our indexes can be confident that the weightings required in their portfolios will match the shares available in the marketplace."

Caselet 2

Read the following caselet carefully and answer the following questions:

9. The caselet suggests that there is a correlation between the stock price movements and trading in large chunks of stock. Do you agree that this finding, to a certain extent, upholds the use of technical analysis? Explain.

(7 points)

10. How can net present value be used to value stocks? If it fails in the short run, what is the technique used?

(7 points)

CEOs always want to know how the market will react to new strategies and other major decisions. Will a company's shareholders agree with a particular move, or will they fail to understand the motives behind it and punish the stock accordingly? And what can management do to improve the outcome?

Trying to predict stock price movements is necessary, of course. After all, when stock prices fall, the cost of borrowing and of issuing new equity can rise, and falling stock prices can both undercut the confidence of employees and customers and handicap mergers. Unfortunately, however, most of these predictions are no more than rough guesses, because the tools CEOs use to make them are not very accurate. Net present value (NPV) may be useful for estimating the long-term intrinsic value of shares, but it is famously unreliable for predicting their price over the next few quarters. Conversations with sample groups of investors and analysts, conducted by the company or by investment bankers, are no more reliable for gauging market reactions.

But executives *can* dramatically improve the accuracy of their predictions. By adopting a more systematic, rigorous approach, corporate leaders can learn to understand individual investors as thoroughly as many companies now understand each of their top commercial customers. It is possible to know such customers well because there are only so many of them. Equally, only a finite number of investors really matter when it comes to predicting stock price movements.

Every CEO knows that when buyers are more anxious to buy than sellers are to sell, share prices rise—and that they fall when the reverse happens. But fewer CEOs know that not every buyer or seller matters in this equation. Our research on the changing stock prices of more than 50 large US and European listed companies over two years makes it clear that a maximum of only 100 current and potential investors significantly influence the share prices of most large companies. By identifying these critical individual investors and understanding what motivates them, executives can predict how they will react to announcements—and more accurately estimate the direction of stock prices.

Armed with these new and solid insights about how critical investors behave in specific situations, executives can make strategic decisions in a different light. Knowing what makes crucial investors buy, sell, or hold the company's stock allows CEOs to calculate what its share price might be after an announcement and to factor this calculation into their strategic and operating decisions. To head off short-term selling, a company could manage the timing, pace, or sequencing of strategic announcements. It could introduce a new management team before announcing an acquisition. It could also test an important new product in selected markets before the nationwide rollout. How will investors react to a merger announcement and what will the resulting share price mean for a deal? How might a spin-off fare in the market? Does the company need to prepare the market or to consider a carve-out instead?

Caselet 3

Read the following caselet carefully and answer the following questions:

11. The caselet states that the effect of increase in the volatility of stocks is neutralized by falling correlations among stock returns. Comment.

(8 points)

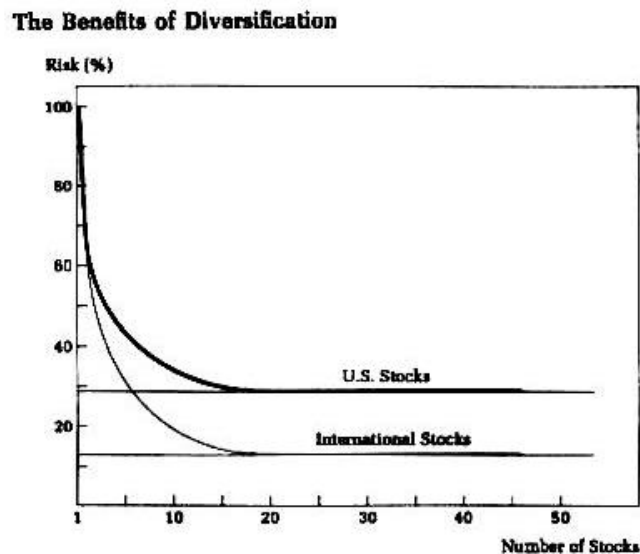
12. What is Terminal Wealth Dispersion of a fund's return? How is it different from the standard deviation of a fund's return?

(7 points)

One of the most dangerous investment chestnuts is the idea that you can successfully diversify your portfolio with a relatively small number of stocks, the magic number usually being about 15. For example, Ben Graham, in *The Intelligent Investor*, suggests that adequate diversification can be obtained with 10 to 30 names. In a classic piece in *Journal of Finance* in 1968, Evans and Archer found that portfolios with as few as 10 securities had risk, measured as standard deviation, virtually identical to that of the market. Over the decades, the "15-stock diversification solution" has become enshrined in various texts and monographs, most famously in *A Random Walk Down Wall Street*:

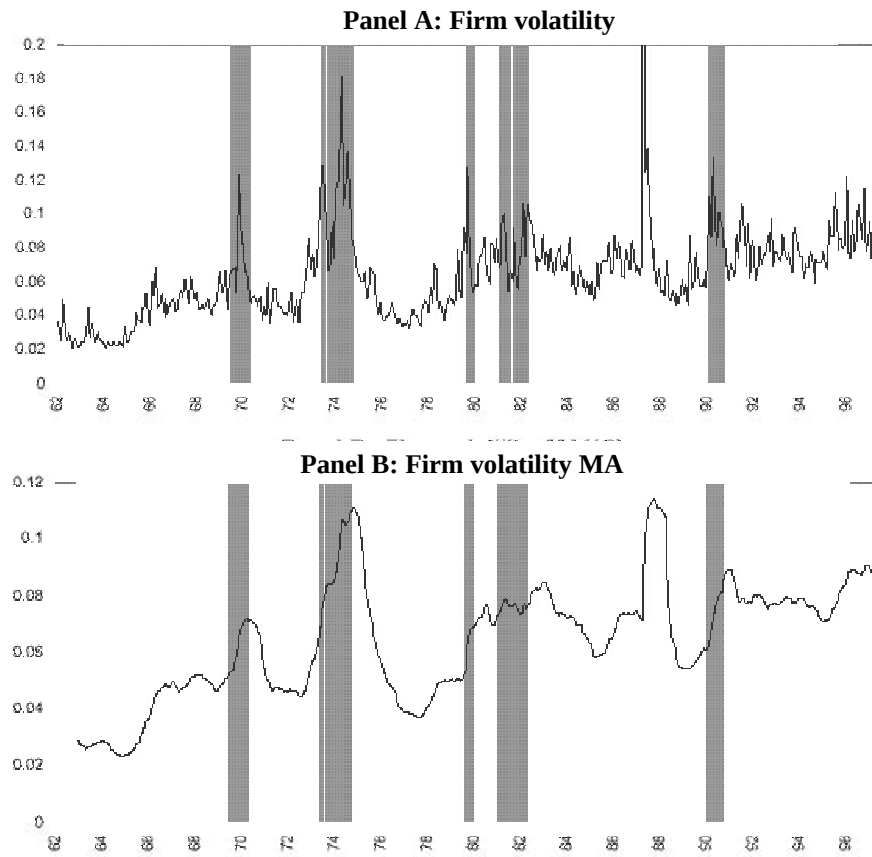
By the time the portfolio contains close to 20 equal-sized and well-diversified issues, the total risk (standard deviation of returns) of the portfolio is reduced by 70 percent. Further increase in the number of holdings does not produce any significant further risk reduction.

To emphasize the point, Mr. Malkiel collated data from a paper by Bruno Solnik, and combined the reduction in risk of both domestic and international portfolios into one nifty graph:

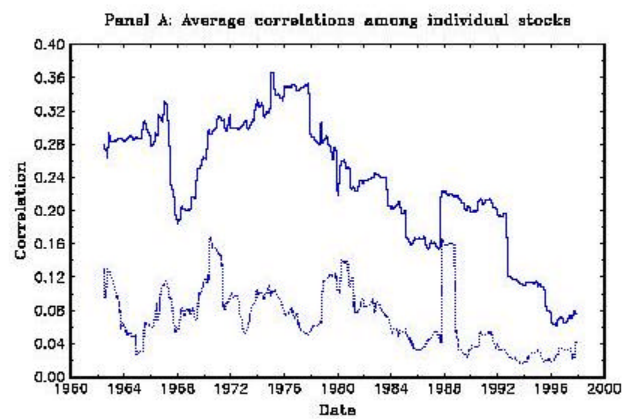


In a paper recently accepted for publication in *Journal of Finance* Mr. Malkiel *et. al.* extend and update the state of our knowledge regarding portfolio diversification and market volatility. It's a wonderful piece, well-written and quite understandable, and comes to four fascinating conclusions:

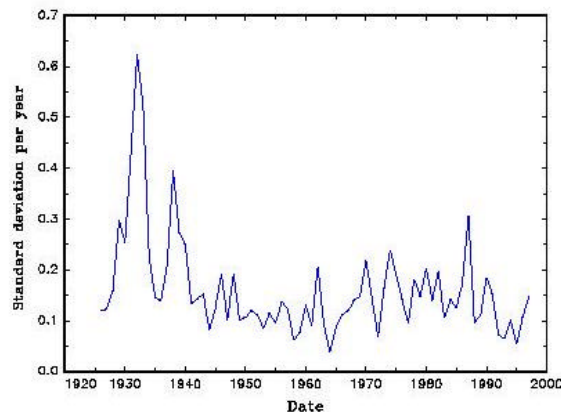
1. The volatility of individual stocks has risen over the past few decades (the upper plot represents monthly returns, the lower plot annualized monthly returns):



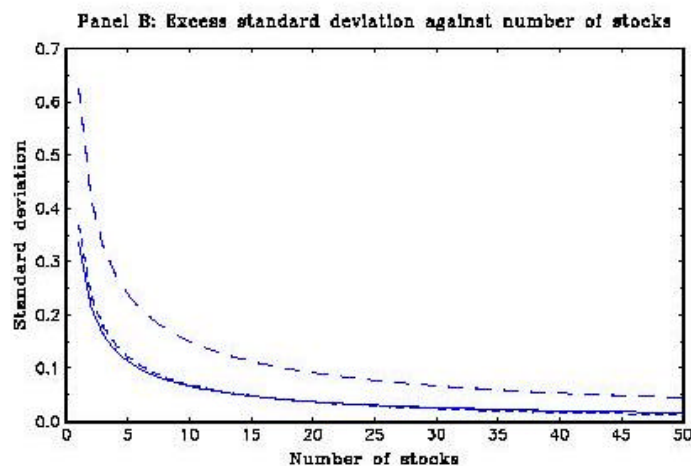
2. The correlation among stock returns is falling (the solid upper line represents monthly data, the lower line daily data):



3. The effects of #1 and #2 cancel each other out. Consequently, the overall volatility of the market has not changed:



4. However, also because of #1 and #2 the number of stocks necessary to eliminate nonsystematic risk is rising (the upper curve represents the more recent period):



This is all profound and important stuff. And, unfortunately, highly misleading. To be blunt, if you think that you can do an adequate job of minimizing portfolio risk with 15 or 30 stocks, then you are imperiling your financial future and the future of those who depend on you. The reason is simple: There are critically important dimensions of portfolio risk beyond standard deviation. The most important is so-called Terminal Wealth Dispersion (TWD). In other words, it is quite possible (in fact, as we shall soon see, quite easy) to put together a 15-stock or 30-stock portfolio with a very low SD, but whose lousy returns will put you in the poorhouse.

END OF PART E

END OF QUESTION PAPER

Suggested Answers

Security Analysis – II (212) : July 2002

Part D : Case Study

1. Michel Porter's Analysis :

- a. Threat of Entry:
 - Threat of entry is low, as the industry is capital intensive.
 - As distribution of tyres requires an extensive dealer network, access to the dealer network/need to establish a network may also act as a barrier.
 - Access to technology may also act as an entry barrier, as the industry is technology intensive also.
 - The healthy growth of some segments of the auto industry like the two-wheeler segment may attract some new players.
- b. Bargaining power of suppliers:
 - Due to lifting of physical barriers for imports, domestic producers of natural as well as synthetic rubber do not have much bargaining power.
 - Rubber is the most important raw material used by the industry. The prices of rubber and its availability fluctuate depending on the global demand and supply conditions. As the world economy as a whole is in downtrend at present, bargaining power of suppliers is not high.
 - The second most important raw material used is Carbon Black. There are only three suppliers of Carbon Black in India. However, as a major portion of their output is consumed by the tyre industry their bargaining power is not high.
- c. Bargaining power of buyers:
 - Due to economic downtrend, demand for vehicles is low, which in turn had an adverse impact of the sales of tyres.
 - The major buyers of tyres are the big automobile companies, who buy tyres in bulk. Their bargaining power is generally high.
 - The retail customers who buy tyres for replacement do not have any bargaining power.
 - The switching costs are not likely to be high in this industry. Therefore, it can increase the bargaining power of the buyer.
- d. Threat of substitutes
 - There are no known substitutes to tyres as of now.
 - With the restrictions on imports being lifted, Chinese tyres are expected to pose some threat. However, the industry players are not taking it seriously, as the quality of the Chinese tyres is said to be low
 - Due to import duty anomalies, tyres imported from South Korea are currently posing a threat to the Indian industry.
- e. Competitive rivalry of the companies
 - Due to the current economic downtrend, competitive rivalry of the players is bound to be high.
 - Lifting of restrictions on imports is also likely to increase the competitive rivalry of the companies as it may lead to squeezing of margins due to low prices and entry of new brands.
 - The entry barriers being high, the rivalry is likely to be moderate.

2. From the financial statements given in the case, the following observations can be made about the financial condition of Apollo Tyres:

Profitability:

- The growth of sales has been good in the last two years. The proportion of cost of sales in sales has been increasing due to increase in cost of material, manpower costs and other costs.

- During the year 1999-2000, profitability increased substantially due to other income of Rs.200 million. It has come down in 2000-2001 as other income decreased. Finance charges and depreciation have also been higher in 2000-2001.
- The above is also reflected in the pre-tax and post-tax profit margins. Return on networth and capital employed also follow the same trend. The trends followed by EPS and CPS also tell the same story.

Activity:

- All the turnover ratios have declined or are showing marginal increases in the past few years. However, sales have been growing. This indicates investment in assets, which is yet to be put to full use. There has been a sudden decline in 1998-1999, and thus the situation is relatively stable.
- In particular, there appears to be some accumulation of inventories, as the inventory turnover ratio declined to about half in the last four years.

Liquidity and Leverage:

- The liquidity position is quite stable, with the current ratio being maintained around 2.0.
- Debt-equity ratio is quite low, which is a healthy sign.
- Though the interest coverage ratio increased upto 1999-2000, it declined steeply in 2000-2001, due to higher finance charges.

If the contingent liabilities reported by the company turn out to be actual liabilities (long term), the debt equity ratios will be as follows:

03/1998	03/1999	03/2000	03/2001
$\frac{1280.1 + 2948.6}{2725.0}$	$\frac{(812.7 + 2940)}{3150.0}$	$\frac{(802.9 + 3352.9)}{4033.9}$	$\frac{(858.2 + 3766.4)}{4072.7}$
1.55	1.19	1.03	1.14

If the contingent liabilities turn out to be actual long term liabilities, the debt equity ratio increases, but is still within the comfortable range.

3. The equation for SML can be derived by running a regression between the beta values given and the corresponding return:

$$\text{Value of A (R}_f\text{)} = 0.0836$$

$$\text{Value of B (R}_m - R_f\text{)} = 0.0438$$

$$\text{The equation is } 0.0836 + 0.0438\beta$$

Where β is the beta of the stock.

The beta of Apollo Tyres can be determined based on the returns from the stock and the returns on the index.

Date	Return on Apollo (%)	Returns on Index (%)
June 30, 1999	-8.04	2.41
January 03, 2000	181.85	60.22
June 30, 2000	-44.58	-16.91
January 01, 2001	-6.76	-15.42
June 29, 2001	-32.69	-20.96
January 01, 2002	28.96	-2.59

On regressing, $A = -5.80$

$$B = 0.35$$

Beta of Apollo Tyres = 0.35

Expected return from Apollo = $0.0836 + 0.35 \times 0.0438 = 9.89\%$.

According to DDM,

$$P_0 = \frac{D_1}{k - g} \text{ or } 75 = \frac{4.4 \times (1 + x)}{0.0989 - x}$$

$$75 \times 0.0989 - 75x = 4.4 + 4.4x$$

$$7.42 - 4.4 = 75x + 4.4x$$

$$x = \frac{3.02}{79.4} = 0.0380 \text{ or } 3.8\%.$$

4. At point A, the price line rises above the moving average line, which is showing a slight down trend. It is an indication to sell. Around that time, the MACD indicator crosses the reference line from below (C), and it is end indication to buy.

At point B, the price line falls below the moving average line which is showing an uptrend. It can be considered a secondary reaction and a bounce back of prices should be expected. In February, the MACD line crosses the reference line from above (D) and hence is an indication to sell.

5. According to H-model, the share price can be calculated as follows:

$$P_0 = \frac{4.00(1 + 0.10) + 2.5(0.20 - 0.10)}{0.15 - 0.10} = \frac{4.40 + 0.25}{0.05} = \text{Rs.93}.$$

The share price of the company should increase to Rs.93 after the restructuring.

Part E: Caselets

Caselet 1

6. If the floating stock is low, even for small quantities of purchase of the stock by fund managers, demand – supply gaps are bound to arise. If the demand is higher and supply is low, prices will increase due to the orders placed by the fund managers themselves. Hence, each additional purchase will have to be made by the fund manager at a rate higher than the earlier. The additional amount thus paid is the impact cost.

Impact costs tend to be high due to long settlement periods also. The stock subject to a transaction will not be available to the buyer or the seller during the period between the day the buyer has to deliver and the day the seller can expect to take delivery of the stock. As the stock is effectively taken off the market in the intervening period, impact cost is likely to be high. Similarly, companies (or their share transfer agents) taking a long time to transfer shares (as in the earlier days) can also add to the impact cost.

7. If there is drastic change in the free float of any stock which constitutes to the index, the index should be adjusted for the additional/ reduced liquidity of that particular stock. This is an important measure because if there is no change in the index even after changes in the liquidity of a particular stock, the basic purpose of free float system will not materialize. Free float gives more weightages to those companies whose major chunk of stocks are available in the market. Preferably, BSE has to rebalance its indices every year to incorporate the changes in the free float of the various stocks constituting these indices.

Institutional investors often make their investments to track the performance of an index. If there are changes in the floating stocks and consequently the index they track, they have to rebalance their portfolios. If there is no change in the index, the implications above are limited to capital gains/losses due to changes in stock prices resulting from changes in floating stocks. If there are changes in the index, they also have to incur transaction costs in rebalancing their portfolios.

8. If a company that is included in an index has a large free float, it gets a higher weightage in the index. It thus attracts larger investments from fund managers who want to track the index it is part of. However, if a company is not part of any index, it may not attract any additional investment in spite of its large proportion of floating stock. Thus, it may not benefit at all.

But, due to its large floating stock, if the company is otherwise worthy, it may become a strong candidate for inclusion in the index later.

Caselet 2

9. According to the caselet, trading in substantial chunks of a company's stock can have a strong influence on the stock price. It does appear to be upholding the use of technical analysis to the extent volumes point towards share price movements. However, it does not throw any light on the use of price charts.

The caselet also talks about the trading in stock by the important stockholders of the company. Sales of stock by major shareholders gives some signals to the investing public – the impact of the signals on the stock prices should also be taken into account while interpreting the high correlation between the stock prices and the trading in large chunks of stock.

10. The technique of net present value involves determination of future cash flows and their discounting with opportunity cost of funds and reducing the initial investment from the value thus obtained. The technique can be applied to valuation of shares – the cash flow that may be earned in future can be discounted with required rate of return to obtain the intrinsic value of the share. However, the intrinsic value of the stocks is said to be a good measurement only in the long run. In the short run, for making buy and sell decisions, technical analysis is used.

Caselet 3

11. The correlation among stock returns indicates how much return of a stock is correlated with other stock's return. It is also a relative measure to decide movements of a stock returns together. The correlations among stock has got significant role to play in deciding diversification benefits of portfolio if it contains different kinds of stocks. If the correlation among stock's return chosen for a portfolio is low or negative, the unsystematic/ diversifiable risk of the portfolio will decline. This is because if correlation between two stocks is low or positive one stock may produce higher return when the other stock will be generating a very low return, and thus the overall return from the two stocks will be evened out in a portfolio. High correlation among stock returns can lead to a very volatile portfolio return. The reason is, in case of declining return scenario most of the stock will yield lower return while maximum number of stocks will produce attractive returns. Clearly, low or negative correlation among stocks will bring down the risk of portfolio on the other higher volatility of stocks will push the risk of a portfolio northward and hence both factors combined together will neutralize the impact of each and other.
12. Terminal wealth dispersion refers to variability in value of terminal wealth of a portfolio. TWD is generally calculated by estimating standard deviation of terminal value of a fund. Terminal wealth of fund is nothing but the maturing value of the fund at the end of a specific period. Terminal wealth typically depends on the length of time period for which the investments are held. If two investors are investing in the same type of assets for the same time horizon, their terminal wealth will be the exactly same. But if they are investing in different assets for the same time period their terminal wealth will not be equal. Difference in terminal wealth primarily arises because of investing in different assets. Running a series of simulation for fixed period of holding provides the standard deviation of the resulting terminal wealth level. This is also known as terminal dispersion. This measure is different from usual estimation of risk by standard deviation. Standard deviation of funds return captures the variability of its return at the regular time intervals but TWD measure the variability of the final value of the fund. Estimation of standard deviation is relatively easier task, as it does not demand running simulations.