## **GEMS:** Asia

# Deutsche Bank

# 15 June 2007

# **Asia Economics Special**

Building an International Financial Center in Mumbai

# **Economic Research**

## Author:

Sanjeev Sanyal (+65) 6423 5925 sanjeev.sanyal@db.com



## Deutsche Bank AG/Hong Kong

All prices are those current at the end of the previous trading session unless otherwise indicated. Prices are sourced from local exchanges via Reuters, Bloomberg and other vendors. Data is sourced from Deutsche Bank and subject companies.

Deutsche Bank does and seeks to do business with companies covered in its research reports. Thus, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report.

Investors should consider this report as only a single factor in making their investment decision.

Independent, third-party research (IR) on certain companies covered by DBSI's research is available to customers of DBSI in the United States at no cost. Customers can access this IR at http://gm.db.com, or call 1-877-208-6300 to request that a copy of the IR be sent to them.

In recent years, there has been much public discussion about how to turn Mumbai into an international financial center (IFC). The debate is hardly surprising given the enormous success of financial mega-hubs like London and New York over the last decade. Arguably London is today more important to the world of business and finance than it was at the height of the British Empire. Indeed, London's business engine is now the single most important driver of Britain's economy. Similarly, a large swathe running from Wilmington (Delaware) to Connecticut runs on the financial muscle of the lower half of Manhattan. A successful financial hub, therefore, is more than just an urban manifestation of the financial sector. As we shall discuss below, it has an independent, internal dynamic that is important in its own right. No wonder that cities like Dubai and Singapore are busy trying to turn themselves into the hubs of their respective regions.

Earlier this year, the Indian government's High Powered Expert Committee (HPEC) put forward its recommendations on how Mumbai could be made into an International Financial Center. The HPEC's report covers a very wide range of issues, including urban infrastructure and financial regulations<sup>1</sup>. It serves no purpose to enumerate the HPEC's numerous recommendations here. The goal of this report is to provide a simple analytical framework that can focus the debate and be used to evaluate, prioritize and sequence the various measures. Let us begin with a basic question – why do we need large financial hubs in a globalized, post-internet world? More fundamentally, since financial hubs are also major cities, why do cities even exist in the twenty-first century?

### Why do Cities and Financial Hubs exist?

Cities have historically existed because people have needed to gather for a variety of reasons – administration, religious pilgrimage, defense, maritime commerce and so on. After the Industrial Revolution, cities grew ever bigger because manufacturing needed concentrations of infrastructure and labour. In contrast, the information technology revolution of the late twentieth-century allowed people to interact and collaborate over large distances. This should have meant that cities gradually dissolved as people moved away from congested and expensive urban areas. This is precisely what was being predicted by many observers in the early nineties. Recall how inner cities in the West were in steady decline from the sixties to the eighties. Many observers thought that advances in communication would make cities irrelevant.

Yet, in the first decade of twenty-first century, we have found that some cities seem to have revived and thrived like never before. Real estate prices have spiraled out in cities like London and New York, suggesting that people are willing to pay ever larger premiums to stay in these urban centers. It turns out that cities continue to be relevant for two important reasons:

**Uncodifiable Human Interaction:** Despite dramatic improvements in electronic systems of communications, many economic activities cannot be codified and electronically transmitted and, therefore, still need face-to-face interaction. This is critical for two types of economic activity. The first are those activities that need constant exchange of ideas and "fuzzy information", especially those areas that are driven by innovation, creativity and the diffusion of ideas. Cities create the concentrations of human capital and the constantly changing "random networks" of people and institutions that are critical to innovation and diffusion of ideas. Second, direct human interaction is critical for the command-and-control functions of large international organizations (personal contact is not just necessary for the exchange of

<sup>&</sup>lt;sup>1</sup> "Mumbai – An International Financial Center", HPEC, Ministry of Finance, Government of India, February 2007.

ideas but also for building trust). This is why the globalized world still needs large financial and commercial hubs like London and New York<sup>2</sup>.

**Lifestyle:** Cities are increasingly required to support the needs of consumption rather than production. This is because successful cities provide a clustering of "hard" amenities such as schools, restaurants, bars, theatres, museums, hospitals and so on. They also concentrate "soft" amenities such as cultural/social organizations, friends, family and so on. People put up with the expense and inconveniences of a city because the concentrated environment.<sup>3</sup> This is a key lure of cities that brings together human capital.

The above two factors are very closely linked since the very amenities that support lifestyle are also integral to direct human interaction and creativity. For instance, ideas are often generated and exchanged in universities and cafes. They are important for both innovation and lifestyle. This is why we find that successful cities, particularly financial hubs, are those that concentrate human capital and encourage meaningful interaction. At the pinnacle of this phenomenon are the so-called "Global Cities" that act as nerve centers of the global economy. There are still very few truly global cities such as New York and London. Singapore is probably in the process of emerging as Asia's first global city. However, there are a number of national and regional cities that are major financial/business centers – Tokyo, Paris, Frankfurt, Hong Kong, Boston and so on.

Note that in all cases, the financial hubs are successful cities in a wider sense. In other words, great financial hubs are good generalists rather than specialists, and they excel in things that may appear unconnected to finance (such as the arts, entertainment, education and so on). However, this is exactly what we should expect in our framework – successful cities concentrate human capital and, therefore, cluster the wide array of services that make a true financial hub.

## **Financial System versus Financial Hub**

It may seem odd to some readers that we have not so far discussed the financial system. This is deliberate because we want to emphasize the difference between wanting a good financial system and a thriving financial hub. The success of a financial system is based on its ability to efficiently allocate resources across competing demands. The success of a hub is based on concentrating a certain kind of business activity. In turn, it is about human capital and interaction. The development of the financial system and the financial hub are obviously linked but they are distinct goals.

This point is neither obvious nor trivial. This can be illustrated by the relative performance of existing Global Cities. New York is America's main financial center and its economic hinterland is far larger than London's (London is not even a fully-integrated member of the Euro-Zone). Similarly, the New York Stock Exchange is far larger than the London Stock Exchange. Yet, over the last decade, London has replaced New York as the world's leading financial/business hub. This is because London has been more successful in attracting talent from across the world (note how some of the richest Indians, Arabs, and Russians live in London).

The HPEC's report discusses the recent emergence of Singapore as Asia's leading financial hub. However, it is interesting to note the factors that have allowed Singapore to slip past

<sup>&</sup>lt;sup>2</sup> For a detailed discussion of the role of Global Cities in the global production process read "The Global City", Saskia Sassen, Princeton University Press, 2001.

<sup>&</sup>lt;sup>3</sup> For a broader discussion see "Consumer City", Edward Glaeser, Jed Kolko & Albert Saiz, HIER Discussion Paper, June 2000.

Tokyo to emerge as Asia's Global City despite the fact that Tokyo has a far larger domestic market. Despite a decade of stagnation, Japan's economy is still the second largest in the world and is thirty-three times the size of Singapore's economy. Yet, Tokyo has remained relatively inward looking and has not been able to leverage the size of its domestic financial system. In contrast, Singapore deliberately focused its efforts on clustering international expertise (partly because it did not have a large home base). Thus, the city-state concentrated on improving the quality of immigration, tertiary education, entertainment facilities and global linkages. Even when it intervened in the financial sector, it systematically focused on areas that involve people and face-to-face interaction (such as private banking). As a result, Singapore built up a cluster of talent over time that swung the odds in its favour. Tokyo is still a major financial hub in its own right but the relative success of the Singaporean approach is instructive (particularly given its natural disadvantages of size and hinterland)<sup>4</sup>. As in the case of London vis-à-vis New York, what mattered eventually was the cluster of people. After all, financial investors can live in London and trade on the NYSE. They can also live in Dubai and trade on the Bombay Stock Exchange.

## Regulatory changes that really matter for an IFC

What does the above discussion imply for Mumbai? The first step is to distinguish between the needs of the Indian financial system and those related to Mumbai as a financial hub. Many of the recommendations of the HPEC and others are about developing the Indian financial system in general. We agree that India needs an efficient financial system for a number of good reasons. However, this is not the same thing as developing the financial cluster in Mumbai into an IFC.

To illustrate this point, let us take an example that has been used repeatedly in the HPEC report. According to the committee's report, if Mumbai became an IFC, a South African railway project may find it attractive to come to the city in order raise money. It is assumed that this implies capital account convertibility. Thus, the HPEC places a great deal of emphasis on capital account convertibility and argues that it must be achieved no later than end 2008.

In our framework, however, capital account convertibility is neither necessary nor sufficient for the Mumbai IFC. According to Pavan Sukhdev, Chairman of Deutsche Bank's Global Market Center in Mumbai, capital controls are an inconvenience than can be circumvented by allowing financial players to legally maintain two sets of books, one for resident clients and one for non-residents<sup>5</sup>. What really matters is whether or not Mumbai has the people with the skills to arrange and structure the financing for the South African railway project. The money can come from anywhere in the world (say Japan or Germany) and need not draw at all from the Indian financial system. In other words, those who emphasize the importance of capital convertibility are making the same mistake as those who used to say that London cannot become Europe's financial hub because it did not adopt the Euro.

The regulations that really matter, in our view, are those that help or hinder the clustering of human capital in Mumbai's financial hub. In particular, we feel that there is a need to re-look at taxes and regulatory restrictions that get in the way of supplying international financial services. We do not wish to list out the litany of problems but a couple of examples will suffice to illustrate the general principle.

<sup>&</sup>lt;sup>4</sup> For a fuller discussion of Singapore's urban re-engineering strategy read "Singapore: The Art of Building a Global City", Sanjeev Sanyal, IPS Working Paper No.17, January 2007.

<sup>&</sup>lt;sup>5</sup> "Mumbai as an International Financial Center: Distant Dream or Imminent Reality", Pavan Sukhdev in Euromoney Outsourcing Handbook 2007-08.

An obvious feature of an international financial hub is that it attracts international money managers. Yet, current regulations and taxation arrangements make it very difficult for residents in India to manage foreign funds invested into the local stock-market. As a result, most foreign institutional capital invested in India must be directed through off-shore entities based in places like Mauritius and Singapore. This is a debilitating system as it actively discriminates against building up fund management expertise inside the country <sup>6</sup>. Rationalization of this imbalance does not require easing of overall capital controls (these foreign funds are flowing back and forth anyway) but merely a policy approach that is sensitive to the need to cluster skills and expertise in Mumbai.

Similarly, Indian tax laws currently try to capture revenues from all international financial transactions directed through India irrespective of whether or not the transaction is related to India. Returning to the earlier example, a Japanese investor in the South African railway project would have to pay Indian taxes just because the transaction was arranged by a Mumbai-based party. Not only are Indian taxes very high by international standards, the system is complex and prone to unpredictable changes. Clearly, a Mumbai-based entity would find it very difficult to compete in this environment. Note that we are not arguing for a "tax-haven" as in the Cayman Islands or the Isle of Man. As argued by the HPEC, a simple system with low and uniform tax rates would achieve the goal. We agree with the HPEC that the best option is to create a simple system for the country as a whole, as per the recommendations of the Kelkar Committee. However, as a second best solution, the government could recognize international financial services as an export and therefore accord it the special status as given to many other export sectors. This is no small sector – the HEPC estimates that Indian households and firms alone will buy USD48-70bn worth of international financial services by 2015.

## **The Legal Framework**

A successful financial/business center is defined by its ability to continuously innovate. However, innovation does not mean chaos, and a system is needed to ensure that these economic activities are properly regulated and that all parties are treated fairly. The trick is to balance the need to control with the freedom to innovate. This is no easy task and regulators work hard to maintain a balance. The Indian financial system is jointly regulated by the Reserve Bank of India (RBI) and the Securities and Exchange Board of India (SEBI). Even as India's financial markets were liberalized in the nineties, it suffered from a series of financial scandals. In response, the RBI and SEBI tightened regulations and supervision. The result is a financial system that is now reasonably well regulated. Nonetheless, it still falls short of what is needed for an IFC. As the HPEC points out, the regulatory environment finds it especially difficult to deal with continuous innovation.

The committee has recommended the adoption of a "principles-based" regulatory system used by Britain's Financial Services Authority as opposed to the "rules-based" system used by most other jurisdictions. We agree with this approach. However, we would like to draw the reader's attention to the wider legal framework. India inherited a common-law based legal system from the British and it is sometimes cited as a factor in favour of doing business in India. However, it is widely acknowledged that the system has become dysfunctional – the

<sup>&</sup>lt;sup>6</sup> "Brown Equities, White Profits", Surjit Bhalla, Business Standard, 4th February 2006. Over the last year, regulations have been eased to allow residents operate FII sub-accounts but the system remains very cumbersome according to most market participants.

laws are antiquated and contradictory, the judicial process is painfully slow and the judges/lawyers lack the specialized knowledge to deal with commercial innovation<sup>7</sup>.

This is an important drawback for Mumbai because the financial sector does not exist in a vacuum but as part of the overall business eco-system. Even if financial regulation was improved, it would not necessarily help if other parts of the legal system cannot enforce contracts in a fair and timely manner. For a true international business/financial hub, it is essential that it is considered a preferred location for international arbitration and dispute resolution. Note how New York, Singapore and particularly London play an important role in international arbitration. Their roles as financial hubs are critically linked to the trust embodied in their judicial process. Thus, Mumbai will have to look at improving the legal system for the country's commercial law as well as the Mumbai High Court's ability to deal with cases that involve foreign parties (including those where both sides are foreign).

This brings us back to a more fundamental point. The creation of an international financial hub in Mumbai has to look at the wider eco-system rather than just the financial sector. The financial sector is merely the pinnacle of a system that includes inputs ranging from legal services, airlines, logistics, to entertainment and education. As already mentioned earlier, successful financial hubs are first and foremost "global cities" that act as clusters of human capital. If one can bring together the right people and institutions, the economics will follow.

## The Importance of Mumbai the City

The information technology revolution has not reduced the need for urban agglomeration and face-to-face interaction. Nonetheless, it has separated physical production and value addition. For instance, London remains the world's shipping hub although it is no longer a port. This phenomenon is possible because so many of the legal contracts, logistics, finance and insurance are arranged in this city. In the same way, its success as the world's financial hub has little to do with the success or failure of the London Stock Exchange. London's success is far more related to its ability to attract talent. This in turn derives from its charm as a cosmopolitan place to live and visit. In short, London's success is more due to its restaurants, theaters, the nearby universities of Oxford/Cambridge, the historic buildings, the museums and so on. No amount of tinkering with financial regulations will help Mumbai unless it can be made to function as an international city. Here is what we feel needs to be done:

First, it must be an attractive place to live for the talented. Attention needs to be given to the lack of schools, quality housing, public transportation, parks, museums/art galleries and so on. If these issues are not tackled, it is entirely possible that we get a vibrant stock-market but none of the gains from having a major international financial hub – financial players can quite easily live in Singapore/ Dubai and trade in Indian markets. Of course, many of these issues need to be tackled anyway for reasons unconnected to the IFC project.

Second, every effort must be made to ensure that the city's human capital does not decluster. Rent-control and road congestion in South Mumbai have steadily forced the economically active population to scatter. Thus, there has been a de-clustering of business activity to secondary hubs like Bandra-Kurla. Some de-clustering is acceptable and even necessary but it must be recognized that this process reduces the intense human interaction that defines southern Manhattan and London's City. In short, too much de-clustering would simply miss the point of being a hub.

<sup>&</sup>lt;sup>7</sup> For a fuller discussion on the problems of the legal system read "Post-Liberalization India & the Importance of Legal Reform", by Sanjeev Sanyal, paper presented at the Conference on Governance organised by India Development Foundation, New Delhi, July 2006.

Third, Mumbai needs more tertiary educational facilities, both inside the city and within easy reach. Education is one way to attract the talented as well as to endogenously generate new talent. This is especially pertinent at a time that a rapidly growing economy is exponentially increasing the demand for skills<sup>8</sup>. Note, however, that a financial hub does not just require a plethora of finance institutes. As pointed out before, a great "global city" is a good generalist rather than a specialist. We need to allow for everything from fashion design and art appreciation to medicine. Since it is not possible to predict the future course of innovation, this requires the deregulation of the education sector so that the supply-side can respond quickly to evolving requirements.

In short, making Mumbai a successful international financial system requires that we think about how to make it a vibrant and attractive city. "Attractiveness" is not just about physical aesthetics but about the "soft" factors that encourage the talented to converge and interact. Manhattan is grey and gritty but it is undoubtedly an exciting place. If India's business and political elite want to turn Mumbai into a real global financial hub, they should worry more about it building schools, hospitals, transport links and art galleries – the financial regulations are the lesser constraints.

## Why an enclave? Where an enclave?

Faced with the enormous task of re-engineering Mumbai's urban infrastructure, the legal system and Indian tax laws, some have proposed the creation of a tailor-made enclave in the form of a Special Economic Zone (SEZ), say in a green-field location near Navi Mumbai. Such an enclave could then be custom built with its own urban infrastructure, international laws and special taxes, unencumbered by the legacy problems of Old Mumbai. This is an attractive option in theory and other countries are trying it. The Dubai IFC is a good example of this approach.

The Dubai IFC is a 110 acre "free zone" which has been granted the power to self legislate on civil and commercial areas. Through an amendment in the UAE Constitution, a separate legal framework has been created by adopting international best practice. To quote the DIFC website, "Both the DIFC Authority and DFSA have reviewed the laws and regulations of the world's major financial centres, and with the assistance of leading professional advisers, have adopted and blended various best-in-class practical concepts to produce a clear, flexible and practical legislative framework". In addition to the legal framework, Dubai is investing heavily in all kinds of urban infrastructure: entertainment, higher education, high-end housing and so on. Ironically, much of the human capital that is needed to man this financial hub will probably come from India, particularly Mumbai.

The HEPC, however, is categorical in its opposition to such an enclave approach. The committee argues that it would take a great deal of effort to police a SEZ with special privileges in order to ensure that there are no leakages to the mainstream economy. It is hard enough to police SEZs dealing in goods but it would be especially difficult with intangible products like financial services. In our view, however, the more important problem with a sealed-off SEZ is that it would find it difficult to reach critical mass if it is starved of the existing cluster in South Mumbai. As we have repeatedly pointed out, the international financial hub works as part of a wider commercial and urban agglomeration. Re-creating this eco-system of hard and soft inter-linkages from scratch would take decades. It will be no easy task to build up the personal and institutional inter-relationships that have evolved over decades in Mumbai. Moreover, attempting to create a new hub in a remote location like Navi Mumbai runs the risk of de-clustering the existing hub in South Mumbai by dispersing the human capital.

<sup>&</sup>lt;sup>8</sup> For a discussion on India's emerging skill shortages read : "China-India and the Global Talent Shortage", Sanjeev Sanyal, DB Global Markets Research, March 2007.

## So what should be done?

Despite our reservations about building a walled-in SEZ in a remote location, we are sympathetic to the idea that it may be more practical to build some sort of a custom-built enclave rather than wait for Mumbai as a whole to reform itself. We feel that there is a hybrid option that could maximize the benefits of an enclave and minimize the costs. Such an enclave need not be a quarantined tax zone. What is needed is a re-developed urban zone with modern amenities – a high-speed rail link, schools, theaters, good quality apartments and so on. Moreover, this zone should be built contiguous to South Mumbai in order to allow easy access. That way the existing commercial eco-system will simply grow into the new area rather than have to be rebuilt. At the same time, it would not de-cluster the existing hub.

The only "special feature" that needs be added to this zone is an improved legal framework with specialized judges/regulators and best practice laws. The Dubai IFC provides one example of how this can work but India itself has experience with specialized courts such as the Securities Appellate Tribunal. Indeed, these courts have been a feature of the Indian judicial system from colonial times (for instance, the old Admiralty Courts that used to specialize in international shipping). Therefore, it would take relatively little deviation from precedent to create a special judicial system for the IFC with a set of laws and procedures that fit international best practice. This would not only benefit the financial system but the large number of Indian companies that do business abroad as well as the multinational who do business in India.

This brings us to the question of where this inner city enclave can be built, especially in a crowded city like Mumbai. The re-development of the Parel mill lands in the heart of Mumbai had presented such an opportunity but, for a number of reasons, the opportunity was not maximized. Fortunately, in the not too distant future, we will have yet another opportunity when the port area on the eastern seaboard becomes available for re-development (the bulk of the active port has drifted off to JNPT on the mainland).

Mumbai's eastern waterfront is a very attractive option because of a number of reasons:

First, it is a very large area. According to a study by the Urban Design Research Institute and the KRV Institute of Architecture<sup>9</sup>, the available area is 1800 acres compared with 400 acres in Parel's mill lands and 110 acres in Dubai's IFC.

Second, it is a strip of land that starts near the Fort (i.e., the traditional financial district) and runs northward along the city. It is not a relatively outlying area like London's Canary Wharf. Thus, it will easily become an integrated extension of Mumbai's urban milieu.

Third, its location along the sea lends itself to possibilities for creating interesting public space and buildings. Virtually all of Mumbai's iconic buildings and public spaces belong to the colonial period. The city needs new architecture to serve its citizens as well as to reflect its role as the dynamic financial hub of an emerging economic power.

Finally, since it is a long, contiguous strip of real estate that runs along the city for roughly 28 km, it could provide the space for a brand new public transport system that could relieve some pressure from the city's crowded roads and trains.

Overall, we feel that it is Mumbai's best bet. The government has been thinking about how this area should be re-developed and had created a task-force to look into it. The UDRI-KRVIA study is a result of that effort. The study is unequivocal that the port land should be reclaimed

<sup>&</sup>lt;sup>9</sup> "A Study of the Eastern Waterfront of Mumbai", Rahul Mehrotra, Pankaj Joshi & Anirudh Paul, UDRI and KRV Institute of Architecture, July 2004.

by the city. We are merely suggesting that the urban re-engineering plan should be integrated with the proposal to create an IFC in Mumbai. This would help both plans. The financial hub would get the space to develop within Mumbai while the urban re-development plan would get a clear economic backbone and a renewed sense of urgency.



Source: "A Study of the Eastern Waterfront of Mumbai", Rahul Mehrotra, Pankaj Joshi & Anirudh Paul, UDRI and KRV Institute of Architecture, July 2004.

# **Appendix 1**

# **Important Disclosures**

Additional information available upon request

For disclosures pertaining to recommendations or estimates made on a security mentioned in this report, please see the most recently published company report or visit our global disclosure look-up page on our website at http://gm.db.com.

# **Analyst Certification**

The views expressed in this report accurately reflect the personal views of the undersigned lead analyst(s). In addition, the undersigned lead analyst(s) has not and will not receive any compensation for providing a specific recommendation or view in this report. Sanjeev Sanyal

# **Regulatory Disclosures**

## SOLAR Disclosure

For select companies, Deutsche Bank equity research analysts may identify shorter-term trade opportunities that are consistent or inconsistent with Deutsche Bank's existing longer term ratings. This information is made available only to Deutsche Bank clients, who may access it through the SOLAR stock list, which can be found at http://gm.db.com

## **Disclosures required by United States laws and regulations**

See company-specific disclosures above for any of the following disclosures required for covered companies referred to in this report: acting as a financial advisor, manager or co-manager in a pending transaction; 1% or other ownership; compensation for certain services; types of client relationships; managed/comanaged public offerings in prior periods; directorships; market making and/or specialist role.

# The following are additional required disclosures:

Ownership and Material Conflicts of Interest: DBSI prohibits its analysts, persons reporting to analysts and members of their households from owning securities of any company in the analyst's area of coverage.

Analyst compensation: Analysts are paid in part based on the profitability of DBSI, which includes investment banking revenues.

Analyst as Officer or Director: DBSI policy prohibits its analysts, persons reporting to analysts or members of their households from serving as an officer, director, advisory board member or employee of any company in the analyst's area of coverage. Distribution of ratings: See the distribution of ratings disclosure above.

Price Chart: See the price chart, with changes of ratings and price targets in prior periods, above, or, if electronic format or if with respect to multiple companies which are the subject of this report, on the DBSI website at http://gm.db.com.

# Additional disclosures required under the laws and regulations of jurisdictions other than the United States

The following disclosures are those required by the jurisdiction indicated, in addition to those already made pursuant to United States laws and regulations.

**Analyst compensation:** Analysts are paid in part based on the profitability of Deutsche Bank AG and its affiliates, which includes investment banking revenues

Australia: This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act.

**EU:** A general description of how Deutsche Bank AG identifies and manages conflicts of interest in Europe is contained in our public facing policy for managing conflicts of interest in connection with investment research.

**Germany:** See company-specific disclosures above for (i) any net short position, (ii) any trading positions (iii) holdings of five percent or more of the share capital. In order to prevent or deal with conflicts of interests Deutsche Bank AG has implemented the necessary organisational procedures to comply with legal requirements and regulatory decrees. Adherence to these procedures is monitored by the Compliance-Department.

**Hong Kong:** See http://gm.db.com for company-specific disclosures required under Hong Kong regulations in connection with this research report. Disclosure #5 includes an associate of the research analyst. Disclosure #6, satisfies the disclosure of financial interests for the purposes of paragraph 16.5(a) of the SFC's Code of Conduct (the "Code"). The 1% or more interests is calculated as of the previous month end. Disclosures #7 and #8 combined satisfy the SFC requirement under paragraph 16.5(d) of the Code to disclose an investment banking relationship.

**Japan:** See company-specific disclosures as to any applicable disclosures required by Japanese stock exchanges, the Japanese Securities Dealers Association or the Japanese Securities Finance Company.

**Russia:** The information, interpretation and opinions submitted herein are not in the context of, and do not constitute, any appraisal or evaluation activity requiring a licence in the Russian Federation.

**South Africa:** Publisher: Deutsche Securities (Pty) Ltd, 3 Exchange Square, 87 Maude Street, Sandton, 2196, South Africa. Author: As referred to on the front cover. All rights reserved. When quoting, please cite Deutsche Securities Research as the source.

**Turkey:** The information, interpretation and advice submitted herein are not in the context of an investment consultancy service. Investment consultancy services are provided by brokerage firms, portfolio management companies and banks that are not authorized to accept deposits through an investment consultancy agreement to be entered into such corporations and their clients. The interpretation and advices herein are submitted on the basis of personal opinion of the relevant interpreters

and consultants. Such opinion may not fit your financial situation and your profit/risk preferences. Accordingly, investment decisions solely based on the information herein may not result in expected outcomes.

**United Kingdom:** Persons who would be categorized as private customers in the United Kingdom, as such term is defined in the rules of the Financial Services Authority, should read this research in conjunction with prior Deutsche Bank AG research on the companies which are the subject of this research.

### Deutsche Bank AG/Hong Kong

### **Asia-Pacific locations**

Deutsche Bank AG Deutsche Bank Place Level 16 Corner of Hunter & Phillip Streets Sydney, NSW 2000 Australia Tel: (61) 2 8258 1234 Fax: (61) 2 8258 1400 Deutsche Bank (Malavsia) Rerhad Level 18-20 Menara IMC 8 Jalan Sultan Ismail Kuala Lumpur 50250 Malaysia Tel: (60) 3 2053 6760 Fax: (60) 3 2026 3906

### Deutsche Securities Asia Ltd

Taiwan Branch Level 6 296 Jen-Ai Road, Sec 4 Taipei 106 Taiwan Tel: (886) 2 2192 2888 Fax: (886) 2 3707 8450

### **International locations**

Deutsche Bank Securities Inc. 60 Wall Street New York, NY 10005 United States of America Tel: (1) 212 250 2500

#### **Deutsche Bank AG**

Level 55 Cheung Kong Center 2 Queen's Road Central Hong Kong Tel: (852) 2203 8888 Fax: (852) 2203 6921

# **Global Disclaimer**

Deutsche Bank AG Level 55 Cheung Kong Center 2 Queen's Road Central Hong Kong Tel: (852) 2203 8888

Fax: (852) 2203 6921

#### In association with **Deutsche Regis Partners, Inc.** Level 23, Tower One Ayala Triangle, Ayala Avenue Makati City, Philippines Tel: (63) 2 894 6600 Fax: (63) 2 894 6638

### In association with TISCO Securities Co., Ltd TISCO Tower

48/8 North Sathorn Road Bangkok 10500 Thailand Tel: (66) 2 633 6470 Fax: (66) 2 633 6490

### Deutsche Bank AG London

1 Great Winchester Street London EC2N 2EQ United Kingdom Tel: (44) 20 7545 8000 Fax: (44) 20 7545 6155

### Deutsche Securities Inc. Level 20, 2-11-1 Nagatacho

Sanno Park Tower Chiyoda-ku, Tokyo 100-6171 Japan Tel: (81) 3 5156 6701 Fax: (81) 3 5156 6700

### Deutsche Equities India Pte Ltd

DB House, Ground Floor Hazarimal Somani Marg Fort, Mumbai 400 001 India Tel: (91) 22 5658 4600 Fax: (91) 22 2201 9094

### Deutsche Securities Korea Co.

17th Floor, YoungPoong Bldg., 33 SeoRin-Dong, Chongro-Ku, Seoul (110-752) Republic of Korea Tel: (82) 2 316 8888 Fax: (82) 2 316 8998

#### In association with PT Deutsche Verdhana Indonesia

Deutsche Bank Building, 6th Floor, Jl. Imam Bonjol No.80, Central Jakarta, Indonesia Tel: (62 21) 318 9541 Fax: (62 21) 318 9560

#### Deutsche Bank AG Große Gallusstraße 10-14

60272 Frankfurt am Main Germany Tel: (49) 69 910 41339

### **Deutsche Securities Inc.**

Level 20, 2-11-1 Nagatacho Sanno Park Tower Chiyoda-ku, Tokyo 100-6171 Japan Tel: (81) 3 5156 6701 Fax: (81) 3 5156 6700

### Deutsche Securities Asia Ltd.

Singapore Branch One Raffles Quay #18-00 South Tower Singapore 048583 Tel: (65) 6423 8001 Fax: (65) 6837 2167

### Deutsche Bank AG

Deutsche Bank Place Level 16 Corner of Hunter & Phillip Streets Sydney, NSW 2000 Australia Tel: (61) 2 8258 1234 Fax: (61) 2 8258 1400

The information and opinions in this report were prepared by Deutsche Bank AG or one of its affiliates (collectively "Deutsche Bank"). The information herein is believed by Deutsche Bank to be reliable and has been obtained from public sources believed to be reliable. With the exception of information about Deutsche Bank, Deutsche Bank makes no representation as to the accuracy or completeness of such information.

This published research report may be considered by Deutsche Bank when Deutsche Bank is deciding to buy or sell proprietary positions in the securities mentioned in this report.

For select companies, Deutsche Bank equity research analysts may identify shorter-term opportunities that are consistent or inconsistent with Deutsche Bank's existing, longer-term Buy or Sell recommendations. This information is made available on the SOLAR stock list, which can be found at http://gm.db.com.

Deutsche Bank may trade for its own account as a result of the short term trading suggestions of analysts and may also engage in securities transactions in a manner inconsistent with this research report and with respect to securities covered by this report, will sell to or buy from customers on a principal basis. Disclosures of conflicts of interest, if any, are discussed at the end of the text of this report or on the Deutsche Bank website at http://gm.db.com.

Opinions, estimates and projections in this report constitute the current judgement of the author as of the date of this report. They do not necessarily reflect the opinions of Deutsche Bank and are subject to change without notice. Deutsche Bank has no obligation to update, modify or amend this report or to otherwise notify a reader thereof in the event that any matter stated herein, or any opinion, projection, forecast or estimate set forth herein, changes or subsequently becomes inaccurate, except if research on the subject company is withdrawn. Prices and availability of financial instruments also are subject to change without notice. This report is provided for informational purposes only. It is not to be construed as an offer to buy or sell or a solicitation of an offer to buy or sell any financial instruments or to participate in any particular trading strategy in any jurisdiction or as an advertisement of any financial instruments.

The financial instruments discussed in this report may not be suitable for all investors and investors must make their own investment decisions using their own independent advisors as they believe necessary and based upon their specific financial situations and investment objectives. If a financial instrument is denominated in a currency other than an investor's currency, a change in exchange rates may adversely affect the price or value of, or the income derived from, the financial instrument, and such investor effectively assumes currency risk. In addition, income from an investment may fluctuate and the price or value of financial instruments described in this report, either directly or indirectly, may rise or fall. Furthermore, past performance is not necessarily indicative of future results.

Derivative transactions involve numerous risks including, among others, market, counterparty default and illiquidity risk. The appropriateness or otherwise of these products for use by investors is dependent on the investors' own circumstances including their tax position, their regulatory environment and the nature of their other assets and liabilities and as such investors should take expert legal and financial advice before entering into any transaction similar to or inspired by the contents of this publication. Trading in options involves risk and is not suitable for all investors. Prior to buying or selling an option investors must review the "Characteristics and Risks of Standardized Options," at http://www.optionsclearing.com/publications. If you are unable to access the website please contact Deutsche Bank AG at +1 (212) 250-7994, for a copy of this important document. Furthermore, past performance is not necessarily indicative of future results. Please note that multi-leg options strategies will incur multiple commissions.

Unless governing law provides otherwise, all transactions should be executed through the Deutsche Bank entity in the investor's home jurisdiction. In the U.S. this report is approved and/or distributed by Deutsche Bank AG Frankfurt authorised by Bundesanstalt für Finanziarenteiset interpreter approved and/or communicated by Deutsche Bank AG Frankfurt authorised by Bundesanstalt für Finanziarenteiset interpreter approved and/or communicated by Deutsche Bank AG Fondon, a member of the LOKAnage and regulated by the Finanzia Services Authority for the conduct of investment business in the UK and authorised by Bundesanstalt für Finanziarenteiset stuggaufsicht. In the AG London, a member of the LONG Stock Exchange and regulated by the Finanzia Services Authority for the conduct of investment business in the UK and authorised by Bundesanstalt für Finanziarenteiset stuggaufsicht (BaFin). This report is distributed in Hong Kong by Deutsche Bank AG, Hong Kong Branch, in Korea by Deutsche Securities Korea Co. and in Singapore by Deutsche Sank AG, Singapore Branch. In Japan this report is approved and/or distributed by Deutsche Securities Inc. The information contained in this report does not constitute the provision of investment divice. In Australia, retail clients should obtain a copy of a Product Disclosure Statement (PDS) relating to any financial product referred to in this report and consider the PDS before making any decision about whether to acquire the product. Deutsche Bank AG Johannesburg is incorporated in the Federal Republic of Germany (Branch Register Number in South Africa: 1998/003298/10) Additional information relative to securities, other financial products or issuers discussed in this report is available upon request. This report may not be reproduced, distributed or published by any person for any purpose without Deutsche Bank's prior written consent. Please cite source when quoting.

Copyright © 2007 Deutsche Bank AG 01/2007