

# The Overcapacity Problem of China

Dr. Efstratios Athanasίου

Industrial Management Division, Department of Mechanical Engineering  
Aristotle University of Thessaloniki  
efsatha@auth.gr

JEL Classification Codes: 053

## **Abstract**

*The profitability of global economic systems is strongly aggravated by the overcapacity in various industrial and productive sectors, caused by the erroneous correlation between the economic growth of recent years and oversupply of products. Economies of world-wide magnitude, such as the Chinese economy, suffer a great amount of losses due to overcapacity that leads to underutilization, low return of investments and bubble phenomena. Although history of economic crises has shown multiple times that on this world-wide level an overcapacity strategy knocks on recession's door, the leaders of global economy tend to recall any previously hard thought lesson only after the door is open; the unstable foundations of economy pass unmarked as long as the numbers prosper. In this paper we present the current state of various industrial sectors in China that suffer from the overcapacity occurred at recent years of fast growth. Our intention is first, to outline the political and economic causes that have led to overinvestment and the impacts caused on an industry-by-industry basis, and second to provide case-specific recommendations on how the Chinese government can bring the issue under control. These recommendations indicate structural changes that need to be made in order to reduce overcapacity and drive economy on to a new level of sustainable growth.*

Keywords: Chinese Economy, Overcapacity, Industrial Sector, US and EU Economy.

JEL classifications: Economywide Country Studies - Asia including Middle East (053)

## **1. Introduction**

The last decade's economic growth of the Chinese operational environment has been integrally linked with the continuously ongoing investment in up-front irreversible decisions regarding the effuse expansion of industrial facilities. This expansion has led to a business framework based on a massive industrialized production machine that oversupplies products, resulting in a tremendous growth of exports. Although this operational pattern worked extremely well in the beginning of the previous decade, the crisis has throttled demand for exports from China at a time when the country's government has already launched a massive stimulus investment package into building new plants, adding thus unnecessary capacity. As a result, the problem is actually getting worse in many industries.

Industrial overcapacity is now having a severe effect on the Chinese economy; the resulted extremely low utilization rates lead to low profits and a lack of sufficient cash for research and development (R&D) projects. Such industries lack innovation, waste resources and often operate in a manner that disregards environmental regulations as well as health and safety standards, circumventing labour and social

laws. Meanwhile, the China's banking system continues to finance the investment program of expanding the already unnecessary capacity in certain industrial sectors, neglecting thus the growing threat stemming from non-performing loans. This volatile environment has global impacts felt in the form of growing trade tensions and frictions that hamper supply chains' operations. The last constitutes a major threat to globalisation's positive effects.

The economic crisis of 2008 has added impetus to find solutions to this key issue of the Chinese economy that affects the global economy. In that direction, this study aims first, in recording the current state of the China's key-industries, second, in highlighting the reasons and decisions that have led to overcapacity, and third in providing socio-politico-economic recommendations to bring the issue under control.

The rest of the paper is organized as follows: Section 2 presents the emergence of China's overcapacity problem and the policies/politics that underpin it, focusing on three key-industrial sectors, and discusses its negative effects both on the growth of China's economy and on the global trade frictions. Based on these insights, Section 3 provides a number of recommendations on how the overcapacity phenomenon can be curbed and proposes specific measures that focus on a more balanced growth-pattern. The final section concludes the study.

## **2. Defining the causes and effects of overcapacity**

The breathtaking growth of China's heavy industry can be summarized in three factors:

- *Rapid urbanization*: Each year, 1% of the population moves into urban areas. The housing development caused by this migration creates massive demand for construction machinery, building and infrastructure materials.
- *Increased savings*: The lack of social security, the stringent capital controls, and the limited investment choices available to households have led to a high savings rate. As a result, capital is continually transferred from households to the production sector (through controlled investment programs), thus augmenting the gap between consumption and production.
- *Decreased input cost*: Government policies stimulate heavy industry, breaking thus the cost.

The interaction among these factors results in a higher share of industry in the Chinese economy (Kuijs, 2006; He and Kuijs, 2007) that has gradually led to the overcapacity faced today; however, the country's overcapacity was a problem long before the 2008 global economic downturn (Chang, 1984). Overinvestment has been a chronic problem in China's economy since the Communists came to power in 1949. Investment was restrained within a tolerable limit during some periods but also led to many crises. In the 1990s for example, excess capacities existing in almost all sectors of the economy led to capacity utilization rates of 35% to 45% in many industrial sectors. To take control of the situation, Zhu Rongji (who was then the Premier) changed the respective state's policies radically by shutting down state-owned enterprises (SOEs) and making redundant up to 40 million industrial workers; at that cost, China's growth slowed for several years. Since China was not then fully integrated into the

global economy, its overcapacity did not translate into a huge trade surplus. That is not the case today.

Between 2003 and 2008 heavy industrial economy experienced a boom; overall ratio of gross industrial output almost doubled to 160% of gross domestic product (GDP) and the relative size of heavy industrial production in the economy nearly tripled. This signalled a new round of overcapacity in the industrial sector. The absorption of much of the overcapacity by foreign economies (mainly the US and the EU) only reinforced the global economic imbalances.

The global trade and financial imbalance was attributed to the twisted relationship between spending and savings within and between China and the US. China's private consumption was the lowest recorded among large economies and its savings rate the highest in the 2000s ([www.rolandberger.com](http://www.rolandberger.com)). On the contrary, US' consumption peaked whereas its savings rates dropped to zero. This was not a coincidence since China and the US simultaneously had the largest trade surpluses and deficits respectively as a share of global GDP, and savings and investment must balance globally. As long as this relation stood, a balance between savings and investment could be met at the global level. However, the crisis of 2008 changed this relationship; China has seen demand plummet, especially from the EU and the US.

China is currently experiencing a deteriorative overcapacity problem due the falling demand in numerous productive sectors, such as the shipbuilding industry, the flat glass and the agricultural sectors. More specifically, the China Association of the National Shipbuilding Industry stated that shipyards' capacity is going to run idle in the coming years, currently facing a utilization rate around 50% (Zheng, 2009). Similarly, the flat glass sector presents a utilization rate of about 70% to 75%, while the soybean oil extraction industry has an utilisation rate of 45% to 50% ([www.rolandberger.com](http://www.rolandberger.com)).

China's State Council highlighted three industrial sectors, the overcapacity problem of which has the strongest impact on economy: the iron and steel, cement, and chemicals sectors. In the following subsections we present the causes and effects of their overcapacity.

### **2.1 The steel, cement and chemicals industrial sectors**

The steel industry faces an approximate 70% utilization rate (Morgan Stanley, 2009<sup>a</sup>), caused by the following major drivers of overcapacity:

- *Local protectionism*: Local governments have introduced local-level economic policies aiming to attract investments, whereas non-local competitors face additional fees for products that are produced in other regions. This desire for self-sufficiency leads to capacity duplication at national level.
- *Overly optimistic forecasts*: Inaccurate forecasts lead to a factitious demand for infrastructure materials that in turns call for new capacity investments.
- *State-owned enterprise model*: The vast state-owned network of production units is insensitive to localized cost, profit and losses and lacks generalized business policies that could identify overcapacity and hamper new investments.
- *Stimulus package*: To boost economy's growth, the government recently launched a stimulus package which encourages large mills to add

capacity (Bloomberg News, 2009); however, this further aggravates their underutilization problem and causes adverse effects to the state's willingness for shutting down the "dirty", inefficient, small and medium-sized mills by comparably rendering them more cost-effective, competitive and profitable.

- *Subsidized energy*: UBS (May 4, 2009) outlined the distorted input prices ([www.ubs.com](http://www.ubs.com)); China's corporate energy price index doubled between 2002 and 2008 whereas the world energy price index rose by more than 400% during the same period. This growth-pattern becomes even more unsustainable given that the country is short in natural resources (half of its oil consumption is met by imports). Moreover, subsidies are indirectly paid for by households due to the systematic force on them to subsidize respective investments which would otherwise have been proven unprofitable.

Although these policies generate employment and underpin the sector's growth, they also lead to divergent growth rates between production and consumption, thus raising a trade surplus.

Respectively, China's cement production accounts for half of global output and is eight times larger than the second-largest producer, India. However, the cement industry suffers from overcapacity and faces a 70-75% utilization rate (Morgan Stanley, 2009<sup>b</sup>). The major drivers are:

- *Urbanization*: With an urbanisation rate of about 42-50% (Standard Chartered Bank, 2009), China requires the construction of unprecedented amounts of urban housing and infrastructure, fuelling massive respective investments.
- *Technology transition "lag"*: industry is composed of large state-owned companies and a plethora of very small producers. Nowadays, the sector goes through a technology change from smaller polluting vertical kilns (used by smaller producers) to larger, energy efficient new suspension pre-heater kilns (deployed by larger producers) (Morgan Stanley, 2009<sup>b</sup>). However, vertical kiln capacity is not yet shutdown, thus creating a capacity lag.

Although the urbanization rate calls for an increased cement production rate, the technology transition lag results in maintaining outdated, energy inefficient and polluting production units.

Regarding the chemical sector, China Petroleum & Chemical Industry Association has examined the overall situation of petrochemicals and chemicals in China and concludes that 50% of them are in a balanced supply and demand situation, 30% of products are in short supply and 20% of products have overcapacity problems ([www.cpcia.org.cn](http://www.cpcia.org.cn)). Overcapacity in the chemical industry is mainly driven by:

- *Desire for self-sufficiency*: Local governments promote chemical industry to stimulate economic activity in their area, boost self-sufficiency and deal with unemployment.
- *Fragmentation of industry*: Many small players operate outside state supervision, resulting in an operating model that finds difficult to identify discrepancies between demand and actual supply.

However, the sector of chemical industry is more "sensitive" than those of steel and cement since the environmental burden stemming from inefficient followed practices can become extremely heavy.

## **2.2 Impact on Chinese economy**

The primary victim of overcapacity is the Chinese economy itself. Companies dealing with low utilization rates have wasted their capital resources and are forced to reduce their costs in order to keep profit margins. The lack of cash leads to lack of R&D projects and innovation, which result in a loss of competitive advantages. In the hope of increasing their overall competitive situation, affected companies are forced to further increase capacity in order to compress the production cost. This is a major obstacle on China's path to become both an innovative and sustainable economy.

Only to make things worse, low profits will bring difficulties in servicing interest payments of the current flood of bank lending. The threat of mounting non-performing loans puts China at risk of revisiting the 1990s non-performing-loan problem; though, at that time the country had the resources to transfer collapsing commercial banks to state-owned asset management corporations. The nowadays pressure of the economic crisis has limited such options. In case Chinese regulators recapitalize the banks, they will have to maintain a wide spread between lending and deposit rates so as to provide banks with sufficient time to transfer capital from households into their capital base in a form of abnormally low returns on savings deposits. This constraining of the household's income-growth in favor of subsidizing inefficient investment decisions will bring an additional increase on the already-large gap between consumption and production.

However, Chinese economy is not the only victim. Since the country is fully consolidated in the global economic system, industries in other regions of the world are also affected by its extra capacity, bringing thus tensions between China and its trading partners.

## **2.3 Tensions on global trade**

Overcapacity directly impacts the global trade tensions among players, and managing the problem must be part of an adjusted plan agreed by China, US and EU. The rising savings rate in US must be met by rising Chinese or foreign consumption rate or rising global investment. If this is not the case, a global equilibrium will not be met easily and new reinforced crisis will incur, characterized by an increased unsustainable US government borrowing and a steep descent on demand for China's products. The outcome will depend to a large extent on government policies in both countries, especially in relation to trade. Key-factors lie in the US' attitude towards its trade deficit, and to a lesser extent in EU's attitude towards absorbing part of this deficit. However, the rising unemployment in EU and US makes it hard to be willing to absorb much more of the cost of any adjustments; this will make discussions over trade harder than ever.

## **2.4 Impact on the environment**

Environmental effects are generally difficult to quantify. According to a World Bank study (He and Kuijs, 2007), the hidden costs of air and water pollution in China amount to about 5.8% of annual GDP. A significant part of that percentage is attributed to the waste of natural resources caused by overcapacity. Companies in this situation feel forced to cut corners, disregard environmental, health and safety standards and circumvent labour and social laws. Rationalizing the pricing mechanisms for natural resources, one would expect that

environmental levies would be strict enough in China; however environmental, health and safety standards and laws are not yet fully implemented and it is essential to be enforced as a first response to prevent further deterioration of air and water quality.

### **3. Recommendations on dealing with overcapacity**

#### **3.1 Measures already launched by the Chinese government**

The Chinese State Council released a statement on September 26, 2009, bringing the problem of overcapacity onto the table (Circular Guo Fa, 2009). In that statement, ten ministries working under the umbrella of the National Development and Reform Commission noted that overcapacity had become a serious problem in many traditional and innovative industries and that many local governments continued to expand capacity "blindly" through "duplicated" investments, without considering the mid and long-term implications: *"What especially requires our attention is that not only traditional industries such as steel and cement that suffer from productive overcapacity are still blindly expanding, but also some emerging industries such as wind power equipment and poly-crystalline silicon have the tendency of duplicating investments"*. The following industries were recognized as problematic, requiring immediate attention: steel, cement, flat glass, coal chemical industry, polycrystalline silicon, and wind power energy, as well as some elements of the electrolytic aluminium, shipbuilding and soybean crushing industries. Facing the threat of factory closures, job losses and mounting bad bank loans, the Council was forced to revise its policy targets, sending two important messages: that first, it wants quality growth, and second it wants to rebalance the economy and achieve sustainable growth. In response to the problems, the following primary measures were announced:

1. Controlled industry-sector growth (strict control of market access, introduction of regulations and codes for land supply, creation of an information release system to monitor industrial output and utilisation).
2. Political pressure on industries that pollute and consume high amounts of energy (strengthening of environmental protection supervision).
3. Foster new industries while upgrading conventional ones (improvement of project approval administration, encouragement for corporate mergers and reorganization).
4. Market-led growth in conjunction with macroeconomic regulation (development of accountability systems for local authorities, improvement of financial supervision and control, reformation of fiscal and taxation system).

The determination of China to put the problem under control is proven by a characterizing example regarding the implementation of the aforementioned measures; the Ministry of Land and Resources established local land and resources offices to better plan and control land use, while at the same time cuts off the land supply for projects that fail to meet certain pre-defined, publicly available industrial policies. Industries such as iron and steel, cement, electrolytic aluminium, plate glass, coal chemicals, polysilicon, wind power equipment and dock berths do not receive land for further development. Instead the Ministry provides high tech, high added value, low cost and low emission industries with the land they need.

### **3.2 Need for further curbing the problem**

The global economic system welcomes the government's determination and the very positive measures already launched, but also cautions that much more remains to be done to tackle this massive problem. Further structural changes must be initiated to bring the problem under control and drive Chinese economy on to a new level of sustainable growth, under which the economic and political conditions ensure that overcapacity will not re-emerge in the future. In the next several sections the study offers recommendations as additional remedies to curb overcapacity, by shifting policy priorities away from investment and export-oriented growth and focusing on more balanced patterns of growth. The first recommendation focuses on how change can be driven through international political and economic coordination.

### **3.3 Coordination of actions on an international level**

As US savings rate rises, the China, US and EU must coordinate in order to avoid escalating an already difficult economic transition for China. A long-term plan should be worked out in which China commits in taking any difficult but necessary steps towards rebalancing its economy and reducing its net exports. In this transition, the US and EU should commit in boosting domestic investment to prevent demand deterioration and keep their markets open for the Chinese products, while China should raise interests and wages, liberalize its financial system, reform land-ownership and revalue its currency. These policies will raise Chinese households' income and allow the growth of domestic consumption, thus removing the subsidies provided indirectly by households to the manufacturing sector. However, the last will aggravate the sector's adjustment to the competitive world.

Although this plan seems difficult and painful, it seems to be the most qualified option available. Otherwise, the raise of US savings' rate will render the Chinese manufacturing sector idle, since EU will not be able to absorb the difference. Without coordination, the world will be abandoned in the lap of global imbalances in unpredictable ways that will further increase trade tensions, harm the political atmosphere and interrupt supply chains.

### **3.4 Investments reduction and growth of domestic consumption**

Over the coming years, Chinese companies must reduce capital expenditure in investments so as to achieve a successful adjustment. The automotive sector provides a respective example; from 2002 to 2005 passenger vehicle capacity annually grew on average by 40%, while utilization rates were falling sharply. In 2007 new investments slowed in an annual 10% capacity growth, ending the car pricing war (which began in 2004) after cumulative 25-30% declines in the three years period; prices are now stable or rising in most sedan categories.

In more recent years, the International Monetary Fund (IMF) reported that China's GDP grew by 7.7% in 2009 while exports were extremely weak, illustrating that the mainland economy is not necessarily export led ([www.stats.gov.cn](http://www.stats.gov.cn)). In particular, CLSA reported that net exports delivered a -47% contribution to GDP growth, while consumption accounted for 52% of growth ([www.clsa.com](http://www.clsa.com)). However in order to further increase domestic consumption, the government should invest in social welfare (social security, pension, healthcare and education) which still accounts for only a fraction of its fiscal spending.

Structural reforms are also necessary in sharing dividends of SOEs' earnings. Lardy (2006) proposes the reduction of high corporate investments through the extraction of dividend payments from mainland SOEs into the shareholders and households' income. Corporate retained earnings would then actually make their way back to residual owners rather than automatically getting reinvested. The growth of domestic consumption is fundamental since consumers in the US and EU will not buy more in the foreseeable future. To further foster domestic growth, the state should invest in developing service industries which would help overcome the country's reliance on exports and contribute towards a more sustainable long-term growth model.

### **3.5 Reformation of the fiscal and financial system**

The fast track plant build-ups create massive industrial challenges and subsequently lead to continuously increasing non-performing loans. Bank lending and approval procedures have to be tightened to avoid further expansion and curb the current overcapacity. The National Development and Reform Commission imposed financing guidelines for banks. Investors are not any more allowed to raise money for unauthorized expansion through bonds, short-term bills, medium-term notes, convertible bonds or equity offerings. The Commission demands even more financing restrictions for industries that suffer from overcapacity. In addition to gaining the regular approvals from China Security Regulatory Commission, all firms in these sectors also have to seek National Development and Reform Commission's approval for any capital-raising. Yet, much more remains to be done.

Though Beijing announced tougher restrictions, lending activities at smaller banks is lively. The utilization of locally available private capital should be encouraged to increase non-state banking and insurance services. This will allow non-urban population to integrate into the banking system and into insurance coverage. A reform of the fiscal system can provide local regions with more funding possibilities (including that of issuing local bonds) and allow market access for specialized, efficient private financial service providers.

### **3.6 Promotion of the services sector**

To prop up the labour-intensive growth of the service sector, Beijing has to remove and reduce restrictions and taxation burdens on the services sector. This will open-up service industry to the private sector and enable private and foreign-invested companies to grow and compete in more services industries, such as insurance, pension, healthcare, tourism, telecommunications and the financial service sector. Further actions could enable vocational retraining of redundant industrial workers for jobs in service industries and the development of a national pension scheme for migrant workers. The growth of the service sector will in turns remove employment pressure faced by local governments, by supporting new job positions while providing more opportunities for "household consumption".

Regarding the healthcare and commercial insurance sector in particular, families should be encouraged to spend greater amounts of their savings in a range of products that can cover the day-to-day risks. Central and local governments should first, inform young people about insurance's benefits (e.g. in schools and universities), and second reach a broader segment of the public by providing media-based education. Micro-credit and micro-insurance could also be proven



helpful both for employers and employees to improve sustainability against unpredicted facts. For example, providing micro-finance to young entrepreneurs in key environmental protection areas or other future technologies would create quality job-opportunities for millions of graduates.

### **3.7 Moving towards privatization**

The most effective way of restructuring the outdated and inefficient capacity in the industrial sector is through a process of gradual privatisation. If privatization is allowed in an over-capacitated industrial sector, the capacity is automatically lowered since low margins and low profits lead to the closing of the least efficient companies (which normally are the oldest ones and most polluting). Though, a fair field between domestic, foreign and state-owned enterprises must be ensured, requiring important structural changes. The current economic climate presents an opportunity for immediate action, since in Europe this process took between 10 and 20 years (depending on the sector); however, it led to the creation of innovative, highly competitive global players.

### **3.8 Invest in innovation**

The process of transforming China into a sustainable economy should be based on knowledge and innovation which will alter its production model from a massive production to a high-quality one, rendering obsolete any old and polluting capacity. At the time being however, the costly and time-consuming R&D activities are not protected as intellectual property of the innovators. If intellectual property is not sufficiently protected, enterprises will be deterred from investing in innovation and will remain mainly assemblers and manufacturers, lacking their own core technologies. To enhance innovation, the disclosure of technical know-how must be limited to what is strictly necessary and the private nature of the "intellectual property right" must be acknowledged.

A significant percentage of innovating projects comes from the small and medium-sized enterprises that usually do not have the political support or financial resources to protect their intellectual property against the numerous copyists. However, they generally play a critical role for the economy's innovation level by bringing revolutionary technologies, products and services into the market and by being important sources of economic growth, competitiveness and employment. To render the small and medium-sized enterprises sustainable, China should establish regulations for them to overcome the difficulties in transparency and in obtaining financing and information. These measures would increase R&D spending and provide funding for key technologies clusters.

### **3.9 Establishment of environmental, safety, health standards and laws**

The state has made initial steps to curb overcapacity by enforcing the employment's and environment's relative importance in comparison to GDP and fiscal revenue, when evaluating its economic growth. However, environmental regulations and their supervision have to be strengthened. In approving new projects specifically, the construction should not be started in case they fail to pass the environmental impact assessment. At the same time, a stricter environmental, health and safety legislation framework would reduce overcapacity in energy-

intensive and potentially polluting industries such as steel, non-ferrous metals and chemicals. To increase control and improve robustness of enforcement, the central government should increase independence of Ministry of Environmental Protection and of Ministry of Human Resources and Social Security at a local level.

### **3.10 Reform resource pricing system**

Global and regional markets are characterised by market-based prices, while some of China's domestic markets are still characterised by government-guided prices. Since total cost stems from an interaction among diverse factors such as supply, demand, quality, and timing, only market pricing could efficiently coordinate economic activity. Furthermore, the reformation of resource pricing is an effective tool towards increasing energy efficiency and reducing overcapacity. Regarding the energy consumption for example, consumers are not yet receiving the proper signals about the true cost of energy use; although coal prices have been partially market-priced, most other energy prices (refined products, electric power, natural gas) are not yet fully market-based. Moreover, energy price subsidies to industry should be reduced while reforming resource pricing, focusing on areas like coal resource tax, electricity price, water and natural gas price. Further realization of the actual monetary and environmental cost could be brought by reforming the resource tax system and increasing the environmental charges.

### **3.11 Exchange-rate adjustment**

The current undervalued exchange-rate of Chinese currency raises the cost of imports and subsidizes local producers. Further, the low money-value obliges households to subsidize investments, especially in the industrial sector. Hence, an exchange rate adjustment could be part of the solution to fight against overcapacity. Though, to avoid a sharp appreciation of currency owed to the rising surplus, the state should not let the exchange-rate float without intervention; this could effectively "push" all the overcapacity back into the domestic economy, a fact that would inevitably raise costs. A gradual step-by-step procedure characterized by the continuous appreciation of the time status along with mild corrective movements, would be proven more practical and qualified for the case of China than long-term and far-sighted programs.

## **4. Summary**

This paper presented the problem of overcapacity in China's production system, focusing on specific industrial sectors. The causes were proven to be grounded in the structural formation of the Chinese economic and political system, thus bringing numerous effects on many industries such as iron and steel, cement and chemicals. These sectors have been brought under the spotlight because they are indicated by the Chinese government to be among those that have the most stressful overcapacity problem. Moreover, their capacity is considered outdated, capital-intensive and energy-consuming, causing severe impacts on the environment and global economy, and hence tensions on global trade. The study presented any measures already launched by the Chinese government and argues that much more remains to be done to curb overcapacity, concluding in numerous but specific recommendations.

## References

- Bloomberg News, "China to Study Curbs on Overcapacity in Steel, Cement," August 26<sup>th</sup> 2009.
- Chang, H., 1984, "The 1982-83 Overinvestment Crisis in China", *Asian Survey*, 24(12), 1275-1301.
- Circular Guo Fa, 2009, No.38 (国发[2009]38号).
- He, J., and L. Kuijs, "Rebalancing China's Economy: Modeling a Policy Package", *World Bank China Research Paper No. 7*, September 2007.
- Kuijs, L., "How Will China's Saving - Investment Balance Evolve?", *World Bank Policy Research Paper 3958*, July 2006.
- Lardy, N., "China: Toward a Consumption-Drive Growth Path, Policy Briefs in International Economics", *Peterson Institute for International Economics*, October 2006.
- Morgan Stanley, "China Building Materials", August 27<sup>th</sup> 2009<sup>a</sup>.
- Morgan Stanley, "China Steps Up Efforts to Curb Overinvestment", September 30<sup>th</sup> 2009<sup>b</sup>.
- Standard Chartered Bank, "China - Urban combat", 21 October, 2009.
- Zheng, L., "Ship sector plan draws lofty goals," *China Daily*, June 5<sup>th</sup> 2009.

## Web References

- [www.clsa.com/index.php](http://www.clsa.com/index.php)
- [www.cpcia.org.cn/html/news/20094/65294\\_5580.shtml](http://www.cpcia.org.cn/html/news/20094/65294_5580.shtml);
- [www.rolandberger.com](http://www.rolandberger.com)
- [www.stats.gov.cn/english/newsandcomingevents/t20091022\\_402595245.htm](http://www.stats.gov.cn/english/newsandcomingevents/t20091022_402595245.htm)
- [www.ubs.com](http://www.ubs.com)

## Author's brief CV



**Efstratios Athanasiou**, Dr. Mechanical Engineer, MSc  
Bachelor Diploma from the Department of Mechanical Engineering of the Aristotle University of Thessaloniki in 2005. Got his Master from the Department of Mechanical Engineering of the University of Thessaly in 2010, supported his Phd Thesis in 2010 at the Department of Mechanical Engineering of the Aristotle University of Thessaloniki. Scientific personnel in the Laboratory of Business Administration of the Industrial Management Division of the Aristotle University of Thessaloniki.  
Specialization field: Industrial Management, Capacity Planning, Production Planning and Control, Quality Management, Supply Chains and Logistics, Modeling and Simulation, Remanufacturing, System Dynamics.  
e-mail: efsatha@auth.gr