



# SELECTED PROCEEDINGS

## MOR'S RAILWAYS DEBT CRISIS AND ITS RELEVANCE FOR RAILWAYS REFORM IN CHINA

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# **MOR'S RAILWAYS DEBT CRISIS AND ITS RELEVANCE FOR RAILWAYS REFORM IN CHINA**

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## **ABSTRACT**

The purpose of this paper is to discuss why China undertook a rapid railway development program, an expedited "Great Leap Forward" in railway investment that is leading to a debt crisis and proposals for railway debt dissolution. It reveals the heavy burden of the railway debt that has been rapidly accumulating since 2005 in China, mainly due to a very large scale construction of high-speed *dedicated passenger* lines (DPLs). By analysing the institutional, economic and technical reasons for resulting in such a huge railway debt crisis, it's suggested that railway debt dissolution should be included in a reform package of separating government from railway enterprise and integrating the whole transport management system, which is the precondition for the sustainable railway development in China.

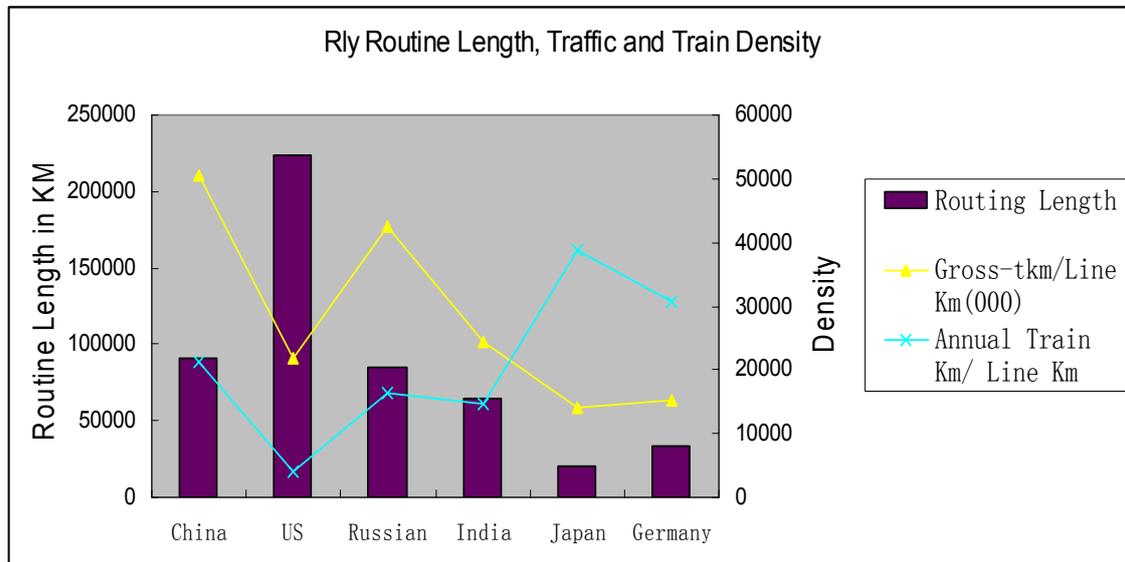
*Keywords: railway development, dedicated passenger line (DPL), debt crisis, Chinese Ministry of Railways (MOR), separating government from railway enterprise, debt dissolution*

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<sup>1</sup> Opinions expressed in this paper are those of the authors alone and neither reflects the opinions of the Beijing Jiaotong University, nor the sponsor's.

## 1. INTRODUCTION

The extremely rapid growth of the economy in China has generated continuing demand for basic commodities, such as coal and steel, which support the railways, while increasing wealth in China has also put extreme pressure on passenger demand. China's over 1.3 billion population has meant that rail passenger traffic has also grown quickly. As Figure 1 shows, the net result of these trends is that Chinese Railways (CR)<sup>2</sup> now has by far the highest traffic density network in terms of Gross Ton-Km per line Km in the World<sup>3</sup>. This capacity stress is aggravated by the fact that the coexistence of relatively fast passenger trains and slow freight trains further strains reliable operations. The Chinese Ministry of Railways (MOR) has viewed the primary challenge as simply being lack of capacity.



**Main source: Union Internationale des Chemins de fer (UIC) , International Railway Statistics 2009 and 2010**

Figure 1 International Comparison on Routing Km vs. Traffic and Train Density

For example, in China there are Six Artery Lines, namely Beijing-Shanghai Line, Beijing—Guangzhou Line, Beijing-Haerbin Line, Beijing-Hong Kong Line, Longhai Line and Zhejiang-Jiangxi Line. For those lines, capacity is almost saturated. Also there are restricted corridors for entrance and exit in some areas. Further, CR has been facing seasonal capacity constraints for many years, esp. during Chinese New Year and Summer Holidays.

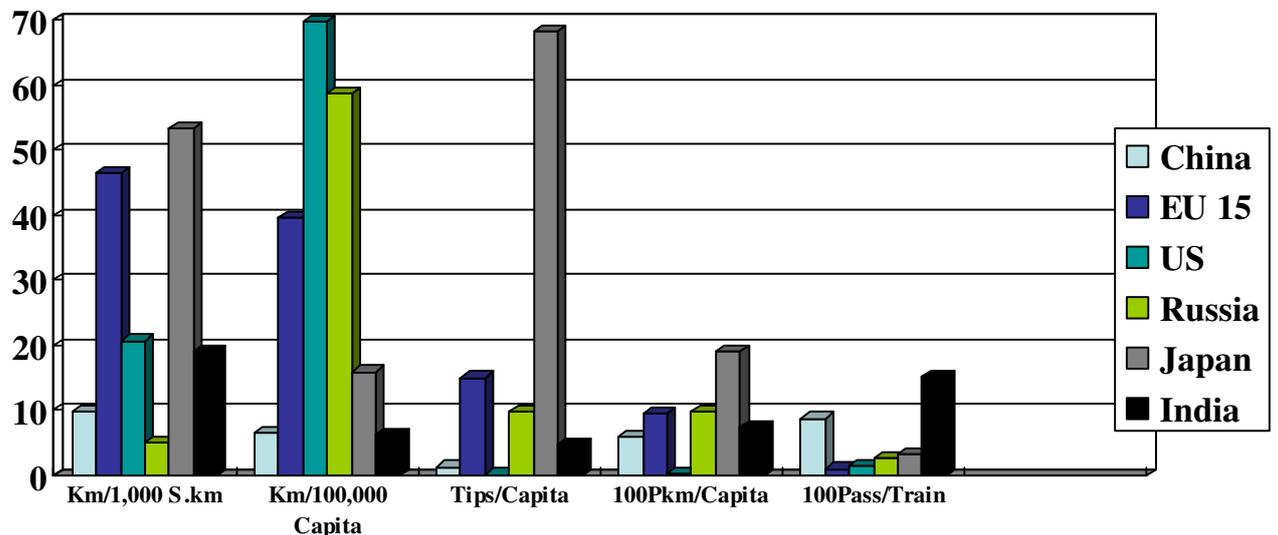
<sup>2</sup> CR refers to the enterprise part of Chinese Ministry of Railways, which is an integrated organization responsible for both government function and railway enterprise at current stage.

<sup>3</sup> The train density in the main lines in China is 2-3 times higher than that of the average.

*MOR's Debt Crisis and Its Relevance for Railways Reform in China*  
*Jianhong Wu; Chaohe Rong*

International comparison shows that in terms of railway network density, trips and pass-km per capita, China is far lower or lower than the major railways in the world, while the average load of passenger train is much higher. Figure 2 indicates as follows:

- China has less than half the ratio of rail line-km/1000 square km of land area than India has, and is even farther below Japan and the E.U.
- China has less than half the rail line km/100,000 population than India, and only half that of Japan, to say nothing of the U.S.
- Chinese people take only one-third the rail trips/capita of India, and one-seventieth that of Japan
- The relative higher number in annual rail pass-km per capita in China suggests that railways play little role in urban transport



**Main source: Union Internationale des Chemins de fer (UIC), International Railway Statistics 2009 and 2010**

Figure 2 Network Density, Average Annual Rail Trips and Pass-Km per Capita

Finally, international experience also shows that railway transport is a powerful tool to support sustainable development (sustainable mobility and logistics). A study (INFRS/IWW 2004) illustrated that in the E.U. the average external cost of railway was less than 1/4 of the road for freight and is only 1/3 of the car for passengers. In China case, a trial study (Nash C., Shires J. etc, 2008) has been finished with the help of the World Bank. The preliminary conclusion showed the average external cost of railways in

China was only 1/25 of that of road for freight and was 1/8 of that of autos for the passengers.

### 1.1 Rapid Railway Development in China

All of reasons mentioned above determined the necessity for rapid railway development in China. Accordingly a Mid-and Long-term Railway Network Program (MLRNP) in China was drafted by MOR and approved by the State Council in 2004. The MLRNP was further modified in 2008 to accommodate the various kinds of demands from the provincial governments. The major content of the MLRNP can be summarized as follows (see Figure 3):

(1). By 2020, railway operating route will exceed 120 000 km, of which the truck high speed railways and the intercity high speed lines, i.e. the dedicated passenger lines (DPL) will take 18000 km, and both the ratio of double-track and electrified line will be increased to 60%.



Figure 3 Mid-and Long-term Railway Network Development Map

(2). Through construction of DPLs and upgrading of existing lines, an express passenger transport network with total length of more than 40,000 km will be formed, which will serve 90% of cities with population over 500,000 (figure 4) .

*MOR's Debt Crisis and Its Relevance for Railways Reform in China*  
*Jianhong Wu; Chaohe Rong*



Figure 4 Map of a Express Passenger Transport Network in China

(3). To Complete the Backbone of Large-capacity Freight Transport Corridors, namely: Coal transport corridor, South-North corridor, Northeast corridor, Southwest corridor and Northwest corridor

The decision makers of MOR believed that building DPLs between neighbouring cities and urban lines must be sustained to maintain present and future economic development. Further, the decision maker also believed that after the completion of the passenger dedicated line, passenger trains can be transferred from existing lines to the DPLs to realize the separation of passenger train from freight one, resulting in a great increase of the freight transport capacity on the existing lines. So completing the DPL network has been a top priority task for MOR since 2006.

## **1.2 The “Great Leap Forward” Railway Expansion Led to MOR’s Debt Crisis**

### *“Great Leap Forward” Railway Expansion*

A large scale railway construction program has been carried out in China since the late 1990's. The total railway investment was 315 billion RMB <sup>4</sup>for the 10th five-year-plan (FYP) (2001-2005) while the total routing length of 6800 km was added to CR's network, which was the only country in the world to build over 1300 km of new line annually. However, MOR which was led by the former Minister, decided to further accelerate the MLRNP as a strong tool to stimulate China's economy in order to cope with the global financial crisis. A “Great Leap Forward” Railway Expansion was implemented in the 11th FYP (2006-2010). The total capital investment approached nearly 2 trillion RMB<sup>5</sup> (Fig 5), with capital spending reaching an all-time record of 700 billion RMB in 2010, which is 9 times the level of investment in 2005. Another 16,000 km new line was built. Most importantly, the investment in DPLs accounted for more than 60% of the total railway investment in the 11th FYP, while the length of new DPL increased from 410 km in 2008 to 5143 km in 2010, ranking No.1 in the World within only 3 years.

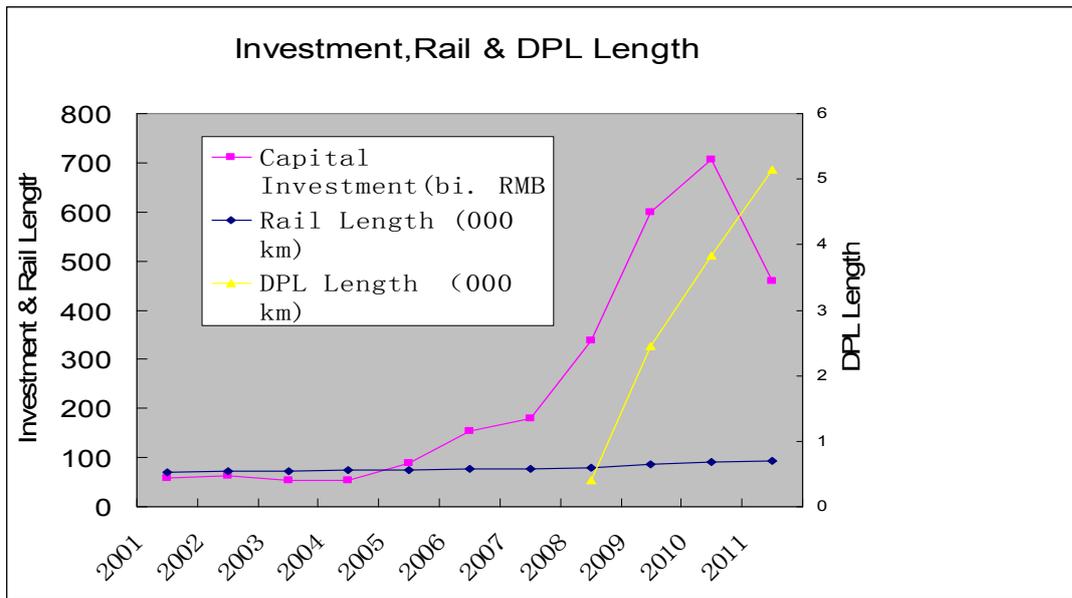
The development of passenger dedicated line is taken as the most significant task in the long-term development plan of MOR and has been the key part of the 11th FYP (2006-2010) and 12th FYP (2011-2015) of the railway sector. According to incomplete statistics, the investment of passenger dedicated lines accounted for more than 60% of the total railway investment in the 11th FYP, while the proportion will be above 70% during the 12th FYP.

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<sup>4</sup> At January 2003 rates, that was equivalent to US\$ 38.10 billion

<sup>5</sup> At January 2011 rates, that was equivalent to US\$ 316 billion

*MOR's Debt Crisis and Its Relevance for Railways Reform in China*  
*Jianhong Wu; Chaohe Rong*



**Source:** MOR's documents on issuing railway bonds

Figure 5 Dramatic Increase of Rail Capital Investment, Conventional Route & HSR Length since 2005

*MOR's sources of funding and its debt crisis*

Figure 6 shows the rapid change of structure of funding for CR's construction investment as follows:

- The average proportion of equity investments, mainly derived from the railway construction fund<sup>6</sup>, central government and local government investment has declined from about 70% between 2000-2005 to only 10% between 2008 and 2010.
- The proportion of debt in the form of bank loans and railway bond has steadily grown since 2006 and reached 60% in 2010.
- The average investment ratio from local governments, which are mainly responsible for land acquisition and resettlement, has increased from about 5% between 2000 and 2005 to about 20% between 2008 and 2010.

<sup>6</sup> The railway construction fund is a fund collecting from a surcharge on freight tariffs in China.

*MOR's Debt Crisis and Its Relevance for Railways Reform in China*  
*Jianhong Wu; Chaohe Rong*

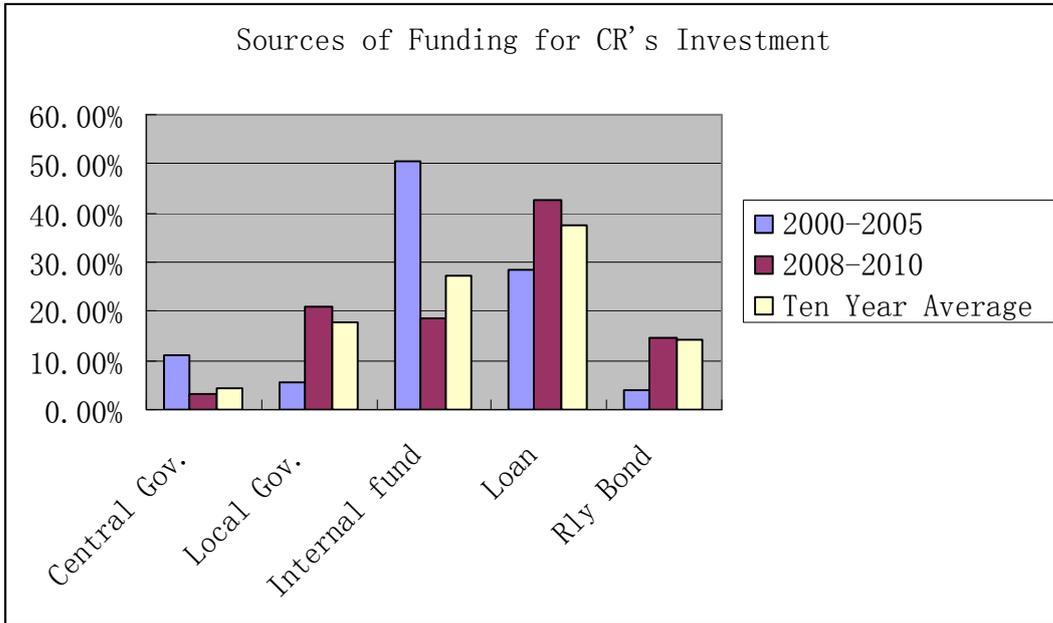
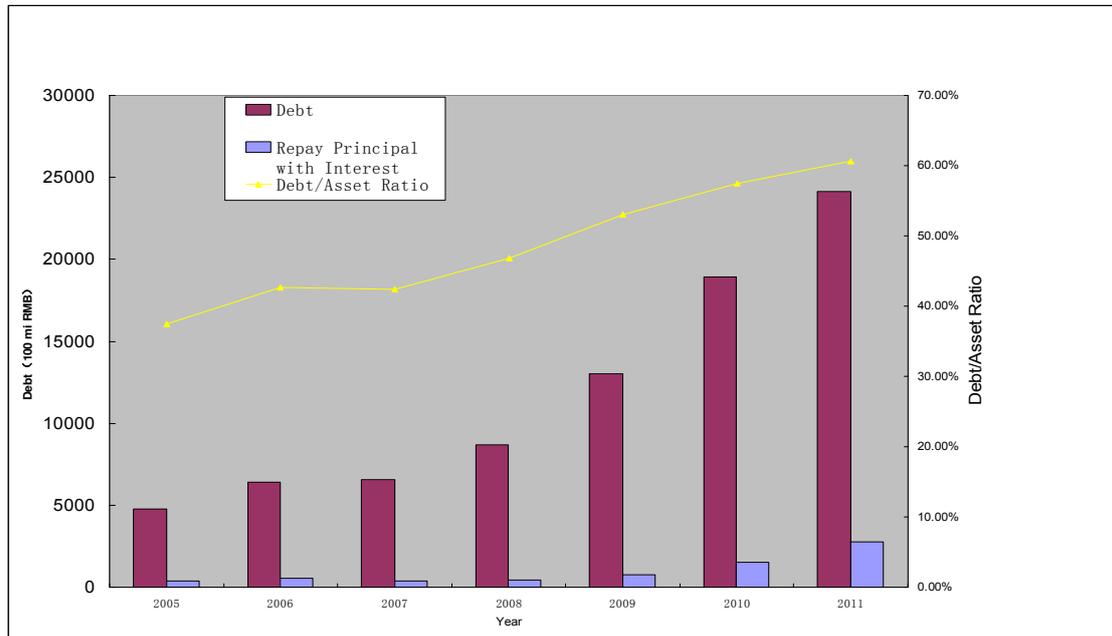


Figure 6 MOR's Sources of Funding for Construction Investment during 2000 ~ 2010

Depending mainly on bank loans and railway bonds after 2006, MOR's debt has been accumulated with incredible speed. In 2005, MOR's total debt was 470 billion RMB, but this number had risen more than 5 times to 2.4 trillion RMB (Figure 7). At the same time, MOR's debt/asset ratio has increased from 37.53% in 2005 to over 60% in 2011. Most importantly, MOR's repayment obligation for principal with interest had soared more than 9 times from 39 billion RMB in 2005 to 275 billion RMB in 2011 while the total transport revenue of MOR was only about 500 billion RMB; i.e. MOR's repayment of principal with interest in 2011 accounted for 55% of its revenue.

*MOR's Debt Crisis and Its Relevance for Railways Reform in China*  
*Jianhong Wu; Chaohe Rong*



**Source:** MOR's documents on issuing railway bonds

Figure 7 MOR's Debt, Repay Principal with Interest and Debt/Asset Ratio from 2005 to 2011

### 1.3 The Initial Operational and Financial Performance of DPLs in China and the relationship with MOR's Debt Crisis

In addition to the current over 2 trillion RMB debts, it is reported that at least 2.8 trillion RBM investment is needed to complete the projects already under construction, of which more than 70% of the investment will have to go to DPLs. Although the railway sector is already facing the dilemma of being not able to finance the capital in the capital markets, the problem is not just the debt service. Further, the projected long-term substantial operating loss is indicative of more bleak prospects. Until the time when a large number of DPLs are put into operation, the huge long-term debt will be beyond MOR's ability to manage. Information shows that almost all the operating DPLs (Table 1) or DPLs under construction are or will be loss-making. Even though a few busy trunk DPLs and DPLs running through contiguous big cities are expected to reduce the loss in three to five years, full-cost<sup>7</sup> recovery and profits are difficult to achieve in the near future<sup>8</sup>. Most DPLs, esp. those that are under constructed in the middle and west part of China, will fall into huge losses within the foreseeable future, and will not be able to survive without external rescue. Taking into account that MOR has been only marginally profitable for

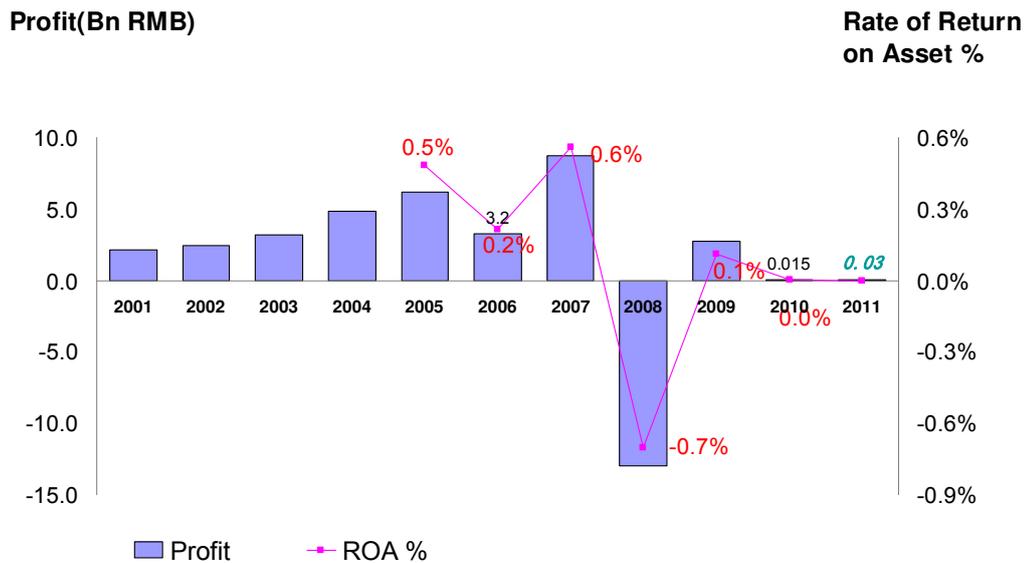
<sup>7</sup> Financial , operating costs, as well as depreciation expense

<sup>8</sup> International experience has shown that only the Tokaido Shinkansen and Paris- Lyon TGV are likely to be financially profitable HSR projects worldwide so far.

*MOR's Debt Crisis and Its Relevance for Railways Reform in China*

*Jianhong Wu; Chaohe Rong*

several years (Figure 8), and the pace of the tariff adjustment can not keep up with rising costs and the increase rate of loss due to the rigid government tariff control and the competition from the air and road, it should not be too surprising that the annual losses of MOR will reach even more than 100 billion RMB sooner or later.



*Source: MOR's documents on issuing its bonds*

Figure 8 Profits and ROA of MOR

*MOR's Debt Crisis and Its Relevance for Railways Reform in China*  
*Jianhong Wu; Chaohe Rong*

Table 1 List of the HSR and Intercity Lines Opening into Traffic by 2011

	Line	Time for opening into traffic	Design speed (km/hr)	Length (km)	Estimated unit construction cost (m euro /km)**	Estimated current traffic density(m pkm/km)	Tariff of 2nd Class of DPLs (euro/pkm)**	Estimated initial financial performance <sup>9</sup>	Main sources: 1. Kiyoharu Takagi (2011); 2. Authors' estimation based on the data collected from various Websites, including JPSKB (极品时刻表), an electric train time table in China
1	Hefei-Nanjing	2008	250	156	6.03	19*	0.037	Loss	Note * for mix of HSR and conventional traffic **Euro exchange rate to CNY was about 8.28788 on 2010-06-30
2	Beijing-Tianjin	2008.8	350	120	20.51	20	0.058	Loss	
3	Qingdao-Jinan	2008.12	250	170	6.27	25*	0.037	Breakeven	
4	Shijiazhuang-Taiyuan	2009.4	250	190	14.48	17*	0.045	Serious loss	
5	Hefei-Wuhan	2009.4	250	202	7.00	14*	0.039	Loss	
6	Coastal DPL	2009.9	250	650	7.24	13	0.037	Loss	
7	Wuhan-Guangzhou	2009.12	350	980	15.69	14	0.056	Loss	
8	Zhengzhou-Xi'an	2010.1	350	456	12.07	4	0.058	Heavy loss	
9	Fuzhou-Xiamen	2010.4	250	275	7.24	19	0.037	Loss	
10	Chengdu-Dujiangyan	2010.5	250	67	18.10	5.7	0.027	Heavy loss	
11	Shanghai-Nanjing	2010.7	350	300	18.10	22	0.065	Loss	
12	Nanchang-Jiujiang	2010.9	250	131	7.24	25*	0.037	Loss	
13	Shanghai-Hangzhou	2010.10	350	154	22.93	20	0.065	Loss	
14	Beijing-Shanghai	2011.7	≥350	1318	19.31	25	0.051	Loss	

<sup>9</sup> See the attachment 1 for the detail via two case studies

In general, MOR has fallen deeply into a serious debt crisis. In fact, it not only has lost any internal financing capacity to manage planned construction needs, but it has also largely lost financial viability over the long term. If China does nothing, the snowball effect of the burdensome debt will make the financial situation of MOR impossible to recover from. Not only will the whole rail system not be able to extricate itself, but also the banks and the entire financial system will be affected in one way or another.

## **2. THE DEBATE AND NEED FOR IMMEDIATE PROBLEM-SOLVING**

### **2.1 The Debate**

It has been suggested that if all the railway projects that have been started can be completed in the 12th FYP (2011-2015) period, then, after that, the railway debt problems will be gradually resolved along with the growth of railway income. It's believed that this is a wishful thinking and blind optimism. First, many projects need to be re-evaluated, in particular for those with excessively high technical standards, inappropriately over-dedicated and over lead. Secondly, the projects that have been completed were generally over budget, so the 2.8 trillion RMB projection is not the final figure. Statistics have shown that a large number of project budgets were increased by 30% to 50% in the implementation stage, and it is very possible that the total investment will rise to 3.6 to 4.2 trillion RMB, or even more. Third, the simultaneous start-up of a large number of new lines will cause a huge loss, and the vast majority of the new lines, esp. DPLs, will not turn loss into gain in a short time. Fourth, whether the final investment is 2.8 trillion or 4.2 trillion RMB, the MOR itself is unable to afford even a small part by its own funds. So in this circumstance even larger borrowing has to be done by MOR, which will only compound the problem.

China has an enormous population and extensive lands, so it is reasonable to build a certain number of DPLs, but problems will occur with the full initiation of the DPLs, or even if "every new line with a speed of 350 km/hr or over" is fully implemented. Dedicated lines are exclusive, but over-reliance on exclusivity in railway operations will result in the reduction of traffic density: the extremely important economic advantages of railway. One of the biggest problems in the construction of DPLs is common use of slab (ballastless) tracks despite the fact that many parts of China have soft soils. Theoretically speaking maintenance cost of slab track is very low, however, due to the requirements of slab track on "no settlement" measured in mm, a substantial increase in construction costs will be required in order to achieve the standards. Even so, settlement of line embankments can still not be avoided due to medium-and- long term natural subsidence and groundwater extraction, which could leave real safety risks hidden under the high-speed rail system for a long time. Because of the lower axle load limitation of slab track, both conventional passenger trains and freight trains can not run on these lines. Moreover, even for the high-speed lines with ballasted tracks, because the limit centrifugal force by superelevation (cant deficiency and excess respectively) of the outer rail in curves such that passenger trains within certain lower speed levels (and

different number of stations served) could not run on these tracks either. These have made or will mean that a large number of DPLs have not enough traffic to maintain its minimum economic traffic of high-speed trains and at the same time the conventional passenger and freight trains that are demanding could not run on the DPLs.

A railway is a transport mode characterized with strong economy of density. Its profitability will not be maintained if it operates with a non-economic traffic density over the long - term. Western countries had dismantled a large number of railway lines, mainly due to low traffic volumes. The transport capacity of a double-track high-speed railway, if accounted in transport density, can reach a hundred of million passenger km per km line (pkm/km) annually, equivalent to daily traffic density of about 280 to 300 thousand pkm/km. Huge investment in the railways needs enough traffic to allocate/dilute the cost, therefore traffic density is a decisive factor for the financial and economic performance of any railway. Some experts estimate that, given the level of the unit construction cost, the high level of debt funding structure (up to 60% of the total investment), the current tariff level and the operating and the maintenance cost of the of DPLs, the breakeven traffic density in China for the DPLs with 300 kph will be about 40 million pkm/km (see the attachment 2). For DPLs with less than 10 million pkm/km annual traffic density, if other trains could not run on them, their operating incomes will have difficulty covering operating costs and interest repayment. If so, these lines will become long-term loss making assets

In recent years, MOR has been emphasizing that one of the advantage of building DPLs is to transfer conventional passenger train from existing line to release of the capacity for freight train, but in reality as most common passenger will not soon change to DPLs passenger mainly due to high level tariff of DPL, which is 3 times as much as that of conventional train, it is difficult to free up a substantial capacity for freight train in most of the existing lines. Further, for those lines or sections where capacities have been released, the increase of their freight traffic is also conditional. These conditions are mainly as follows: (1) the line capacities of the other sections in the whole railway corridor and related transport modes, such as the ports; (3) supply of the cargo, cargo handling capacity of existing line and so on. For the DPLs in operation, the additional revenue cargo volume that can be actually achieved in recent years is quite low, approximately 1/10 ~1/3 of the expected. So, except for those rail corridors with extremely high traffic flows, technically compatible and reasonably mixed passenger and freight trains should be the principle which cannot be ignored in the planning, design and operation of railways. The railway with maximum speed of 200 km/hr has actually been able to meet the majority of passenger and freight traffic needs in China a current stage. Moreover, generally speaking, both the unit construction cost (including the double track upgrading) and the operating cost of conventional railway are 2 and 4 times lower than that of DPLs respectively, and its station location is more convenient for the vast majority of the ordinary travellers<sup>10</sup>. Obviously, to build more conventional railways is also very helpful to solve the coal transport problem that has challenged China for quite long time. Currently, the whole country is keen to building costly DPLs, and even parallel DPLs with the highest standard are built almost the same time in some corridors (such as Beijing-Tianjin

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<sup>10</sup> On the contrary, most of the DPL's stations in China are far from the existing city centre, acting as a strong tool to develop a new city center. A typical example is the Hongqiao DPL terminal of Shanghai which shares the same area with Shanghai Hongqiao International Airport.

and Shanghai-Nanjing) without adequate demand to support both of them. Dilution of traffic makes each parallel DPL difficult to sustain.

## **2.2 The need for immediate problem-solving**

In the current regime, the large scale DPLs' development excessively borrows against the future, which has significantly exceeded MOR's own capacity as well as the affordability of the whole society. However, it is clear that the relevant government departments have been content simply to allow the MOR to issue railway bonds and other loans taken to continue financing from capital markets. This approach is very dangerous because it is only concerned with short-term response measures but ignores the coming debt crisis. It will only further exacerbate the difficulty to solve the problem, and moreover it will not postpone the eventual reckoning for long.

The current investment and financing methods and short-term emergency measures basically focus on only using the credit of the central government to support the MOR to continue to borrow so it can build. If MOR's annual capital investment remains at the level of 700 billion RMB as in 2010, the debt balance in the rail sector will be more than 5 trillion by the end of the "12th Five-Year", and interest payments will raise to over 300 billion RMB in 2015. If MOR's annual capital investment is reduced to 500 billion RMB, the debt balance will be more than 4.2 trillion by the end of the "12th Five-Year", and interest payments will be over 250 billion RMB. Even if MOR's annual capital investment shrinks to 300 billion RMB, the debt balance will still be more than 3.3 trillion by the end of the "12th Five-Year", and interest payments will be over 170 billion RMB in 2015. Obviously, any new borrowing will further increase the industry's crushing debt, and it is highly doubtful whether the financial market will allow it to continue.

The railway debt crisis is about to become a black hole. It is by no means clear that the problem can be solved with more issuing of government backed bonds and contingency financing facility. The fast scale of expansion and the severity of the impact will be much more than the extent most people are willing to accept. In fact, all loans and issued bonds of the MOR are built on the basis of national credit; therefore, in the event of default in its debt, these "debt liabilities" will be immediately transformed into the responsibility of the central government. It is harmful to increase MOR's debt credit rating artificially, which will promote both lenders and borrowers to adopt the attitude of opportunism on risk prevention. If the railway debt crisis can not be solved this time, the cumulative amount of the vicious debt that has to borrow new debt for paying the debt service would soon be over one trillion RMB, and it will not be long to swallow an external relief amount up to 1% of the national GDP. This entirely possible long-term burden is far beyond China's central finance's affordability. In addition, several hundred billion RMB raised by the provincial financing governments for their input into railway construction is facing the same risks. Without any control, total railway debts will reach 5 trillion by the end of 2015, equivalent to 8 to 9 percent of the national GDP. The danger is self-evident.

There are international lessons in this regard, both in Japan and EU. Due to long term poor business management and the construction of the Tokaido Shinkansen, the Japanese National Railways (JNR) began to lose money in 1964, and its losses and debts rapidly increased along with the large scale of Shinkansen construction afterwards. Under the condition that the State paid for huge subsidies annually, the annual loss of JNR even reached a peak of 1.85 trillion yen in 1985. To reduce losses, the JNR raised its tariff 13 times between 1977 and 1986, and the level of tariffs in 1986 increased 38% alone than in 1980, but still to no avail. In 1987 the total JNR debt was Yen 25 trillion (\$US 170 billion approx.) and there were a further Yen 12.2 trillion in JNR-related debts for uncompleted projects, the equivalent to more than 10% of Japan's GDP. Reform was mandatory. Although a part of the debt was repaid through the sale of the former JNR's assets and JR stock, Japan's national finances finally had to pay nearly 3/5 of the national railway debt, and even currently the debt is still being slowly digested by means of the national cigarette taxes.

Numerous cases at home and abroad have expressly showed that high financing costs, unexpected lower traffic and a fragile budget are the three basic factors to cause the debt relationship to deteriorate rapidly. Now it is the time to seriously consider how to dispose of the debt. If the central government could not use a large supply of fiscal funds to shoulder and make direct investment in railway construction in the "12th Five-Year Plan" period, a determined effort must be made to control the scale of debt as soon as possible and deal with the aftermath problems through institutional reform. It is critical to realize that the most important thing is not how the railway sector can borrow more money, but making a serious diagnosis of the projects of under construction and planning. Actions must be implemented as soon as possible to stop the heavy debt continuing to rise sharply, and at the same time properly reorganising the existing debts. It must be made clear what is a reasonable rail network structure in China, minimizing the number of DPLs with slab track as far as possible. "Preferring slower for better quality and performance" in order to avoid greater losses.

### **3. SUGGESTIONS ON MOR'S DEBT DISSOLUTION AND RAILWAY REFORM PROPOSALS**

#### **3.1 Separating government from railway enterprise is the precondition for CR's sustainable development**

The model of railway development and the choice on priority projects have made a number of major mistakes in the past few years, which has not only completely damaged the industry's own self-finance viability, but will also seriously infringe upon the country's economic lifeline. This typical "Rash Advance" caused a huge waste of resources and loss, increasing the transport cost of the society, and making the CR lose its opportunities for sustainable development. Some people are still in favour to retain MOR China, in order to let it act as the responsible body to deal with the accumulated huge debts and complete the railway construction tasks. However, it's believed that separating government from railway enterprises and the establishment of an integrated transport management system, as well as the revocation of the MOR, is one of the effective disposals of the debt crisis and a

prerequisite for the sustainable development of the railway in China. Almost all international lessons confirmed that the predicament of the railway debt is mainly caused by the combination of government functions with enterprise's. Therefore, it must rely on institutional reform to resolve, but must not in turn to rely on debt disposal as a prerequisite for reform. The experience from Russian Railway reform has shown that separation of railway enterprise from government ministry has worked.

During this period, MOR has experienced serious problems, including sector interests first, dislocation of government functions (including absence and offside) and the lack of check and balance on abusing powers. The fundamental reasons are combination of integrating government function with the enterprise's, seeking over large scale of DPL expansion without carrying out financial and economical appraisal, and a lack of integrated transport policies. The result is that it ignores or poorly serves market demand, seriously distorts the allocation of resources, and obstructs the efficiency of the integrated transport system. Continuation of such a regime can only further increase the severity of the problem.

### **3.2 Suggestions on MOR's debt dissolution**

Creation of an integrated transport management system in China has seriously lagged behind, and one of its negative consequences is MOR's out of control debt crisis. From this perspective, the integrated transport system reform must be further pushed forward. The top priority is to separate the government from railway enterprise, and incorporate corresponding administrative functions as soon as possible into a Ministry of Transport (MOT)<sup>11</sup>. Incorporating the government functions of MOR into the Ministry of Transport is conducive to the overall consideration to the rational allocation of resources in an integrated transport system through integrated planning, coordinated configuration of transport capacity and the improvement of transport efficiency. It could, for example, be helpful to solve the railway debt problem by using vehicle purchase tax and fuel tax, but there would be other funding alternatives if the problem is seriously attacked. That is to say that rail debt problems shall be solved in the total plate of the railway reform.

Reform will have costs and need commitment, but the reform program must be designed to be financially secure and stable. Therefore effective debt settlement institutions and mechanisms must be established. The first is not to drastically increase the heavy debt without control, and then to adopt possible ways to gradually absorb the existing debt in a relatively stable situation. The China Railway Transport Company (CRTC) and Railway Construction and the Asset Management Corporation (CRCAMC) should be established as a important step of the implementation of separation of enterprise from the government.

CRTC would be responsible for running the railway infrastructure and operation of the national railway system (including most of the joint venture railways made by MOR and provincial governments), shoulder the purchase and upgrade of related facilities, as well as

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<sup>11</sup> At the time of revising the paper, Chinese government decided to dismantle the Ministry of Railways into administrative and commercial arms in the annual session of the country's top legislature on March 10, 2013.

the new commercial rail projects. A part of the debt should also be taken over by CRTC although the ratio needs to be seriously studied.

The issue of introducing competition into rail transport market and antitrust rules, including rational allocation of train scheduling right, the necessity of vertical separation between infrastructure and operation, and so on, can only be seriously discussed after the implementation of separating of the government function from enterprise. In order to solve the most pressing debt crisis, the separation of government function from enterprise must be firstly implemented, while ensuring safety and stability of the entire railway network, and then come back to resolve problems including the boundaries of the line of business, public service obligation, and the introduction of social (private) capital and the market rule, as well as the responsibility, rights and interests of provincial governments in the provincial railway construction, operation and management and the rationalization on the operation and management of the joint-venture railways.

CRCAMC should be established as a special enterprise. It would be similar to the combination functions of Japan Railway Construction Corporation and JNR Settlement Corporation which were established in the Japan railway reform process. CRCAMC should be responsible for the investment, financing and construction of non commercial infrastructure for the national railway system in the coming period, and for the management of the related assets and debt. It will undertake the ownership of the MOR in the joint venture railways. After the completion of the new railway lines, they would be commissioned or transferred to the CRTC for operation. CRCAMC will assume the responsibility of construction and debt repayment. Its funding sources include the transfer of railway facilities and rental income, sale or disposal of the related assets, part of the railway construction fund, special fund inputs from central government (or possibly part from the fuel tax and vehicle purchase tax).

A detail social cost and benefit analysis of the DPLs should be carried out as soon as possible, which should formulate a key decision factor for CR's debt dissolution.

## **CONCLUSION**

We believe that the railway debt crisis in China did not have to happen. "DPL's Great Leap Forward" is a typical lesson with heavy cost, which was mainly caused by the former leaders of MOR who fabricated and used industry information asymmetry as conditions, deliberately exaggerated the advantage of integrated government function with enterprise operation in concentrating power and resource to do big things, drilled into national planning loopholes, and postponed reforms and violated the basic rules of railway development and market economy. In essence, it is a serious violation of the principle of "development in a scientific outlook" advocated by Chinese Government, and also exposes institutional mechanism problems in the railway development policy making and implementation. Huge railway debt default has been unable to avoid, and debt restructuring is inevitable. The quick process of debt crisis must be integrated with the establishment of a long-term rational and effective public governance structure, and the establishment of an integrated transport system.

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**Attachment 1: Brief analysis for the initial financial performance of DPL by empirical data**

From the financial performance point of view, international experience shows that so far only Tokaido Shinkansen and Paris-Lyon TGV are financial profitable worldwide. In China, due to the limited financial investment from the government, 50%-60% of DPL investment was from bank borrowing. Therefore, very large traffic volumes are needed to support the high financial costs, depreciation, and operating and maintenance costs when the DPL is put into operation. For the most of the DPLs listed in Table 1, the initial financial performance were poor because the actual construction cost of most lines was about 30%-50% higher than that of the feasibility study, while the actual traffic volumes was far below the expectation. The estimation on the financial performance of two DPLs have been made as follows, although very little information is publicly available on the financial performance data of the DPLs.

**The Estimation on the Financial Performance of Beijing-Tianjin DPL**

Item	2009	2010
Pass-trips (000)	18700	22000
Interest payment(m. CNY)	600	600
Repay of the principal (m. CNY)	0	150
Depreciation(m. CNY)	613	613
Total O & M cost(m. CNY)	600	706
Unit O & M cost (CNY/Pass-km)	0.2674	0.2674
Total cost (m. CNY)	18.13	20.68
Average ticket revenue (CNY/pass-trip)	59.38	59.38
Total ticket sale (m. CNY)	11.1	13.06
Financial loss(m CNY)	-702	-762

Source: Author's own computation based on information from WENG Shuping, 2010-04-05, "The Financial Result of Leap Forward: the Annual Operation of Beijing-Tianjin HSR Cause a Loss of 700 million CNY", Economic Observer Newspaper

**The Estimation on the Financial Performance of Wuhan-Guangzhou DPL**

Item	2010
Traffic volume ( m pass-km )	10917
Interest payment(m. CNY)	2600
Deprciation(m. CNY)	3810
O & M cost(m. CNY)	2655
Unit O & M cost (CNY/Pass-km)	0.2432
Total cost (m. CNY)	8410
Rate (CNY/Pass-km)	0.46
Total ticket sale (m. CNY)	5000
Financial loss(m CNY)	-3410

Source: Author's own computation based on information from SONG Jing, 2010-11-29, "5 Billion CNY, The Knack of Wuhan-Guangzhou DPL for Doing Business", The Economic Report in 21st Century

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*Jianhong Wu; Chaohe Rong*

**Attachment 2**

**The Estimation of Break-even Traffic Density of DPL in China via International Comparison**

	Tokaido Shinkansen*	Paris-Lyon TGV*	Beijing-Shanghai DPL	Wuhan-Guangzhou DPL	Qingdao-Jinan DPL	Beijing-Tianjin DPL	Zhengzhou-Xi'an DPL	China DPL (with 300 kph) in average
Tariff (Euro/pkm) in 2010	0.195	0.121	0.051	0.056	0.037	0.058	0.058	0.056
Traffic density (m pkm/km) in 2010	80	20	25	14	25	20	4	
Annual revenues per Km (m Euro/Km)	15.6	2.42	1.275	0.784	0.925	1.16	0.232	
Unit construction cost (m Euros /km)	34.00	15.20	19.31	15.69	6.27	20.51	12.07	15.68
I/O ratio per Km **	0.4589	<b>0.1592</b>	0.0660	0.0500	<b>0.1475</b>	0.0566	0.0192	
Initial financial performance	Full recovery of investment within 8 years	FIRR=15%	Loss	Loss	Break-even	Loss	Loss	Break-even
Break-even traffic density corresponding to I/O ratio=0.145 (m pkm/km)	25.28	18.22	54.90	<b>40.63</b>	24.57	51.28	30.18	<b>40.60</b>

\*: revaluation value in 2003

\*\* : refers to traffic revenue/construction cost per line km of HS-lines