Chinese economic co-operation with Central Africa and the transfer of knowledge and know-how

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Introduction

Some emerging countries have increased their commitment in sustaining the poorest regions of the world, particularly those situated in Africa, on their development path, sometimes raising concerns in the international community for the practices adopted. Among these new donors from the Global South, Brazil, Russia, India, China, and South Africa (BRICS), play the most significant role.

Over the past decades, Chinese development co-operation was driven by the ideologies of the Cold War. However, since the 1990s the Chinese approach to development assistance has followed a more flexible strategy, combining pragmatism and the necessity to deal with the needs induced by its spectacular economic growth. In this context, the economic motivations of Chinese aid are to secure and diversify its sources of raw materials, especially oil, and to extend its foreign markets due to the

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needs of its industry (Dzaka, 2008).

Consequently, Central African countries, endowed with important natural resources (for example oil, mining resources, and so on), constitute privileged partners for China to launch its win-win strategic partnership. It is often argued that Chinese aid contributes to economic recovery in recipient countries, thanks to the boom of raw material exports towards China and to social well-being improvements through public goods delivery, such as electricity, safe water, education, health, transport and telecommunications. Despite these clear advantages, the environmental impact of Chinese aid often tends to be disastrous. In fact, it seems that Chinese Foreign Direct Investments (FDI) towards Central Africa, mainly in the form of joint ventures benefitting from Exim bank and China-Africa Development Fund (CADFund) concessional lending, do not satisfy the environmental norms as defined by international standards.

Therefore, this paper is will analyse to what extent Chinese development assistance, in which the aid–project component is dominant, is associated to a process of knowledge and know-how transfer towards the oil and mining countries of Central Africa. The paper is organised in two parts. The first one presents the institutional architecture of Chinese aid and the duality of its financing framework, while the second analyses the impact of Chinese development assistance on the transfer of knowledge and know-how towards recipient countries in Central Africa.

1. Institutional architecture of Chinese aid and the duality of its financing design

In this section, different types of Chinese aid and their implementation methods are presented. Then, the focus will be on the duality of the financing scheme of aid and its role through the existence of public goods.

1.1 Typology of Chinese aid and its implementation

Following studies by Davies, Edinger, Naidu and Tay (2008) and Wang (2007),

Chinese aid differs from the aid schemes implemented by traditional donors. Its main components are the following:

- Donations, including technical assistance and debt relief;
- No interest loans. These loans are not necessary reimbursed by beneficiary states. Estimates show that about 90 per cent of this form of debt has been cancelled (Guerin, 2008);
- Concessional loans for industrial and infrastructure projects. This type of debt is necessarily reimbursed. The annual interest rate and the delay of reimbursement vary across countries, but usually the average interest rate is 2 per cent and the average delay is 10-15 years.

Five public institutions are in charge of governing Chinese policy of economic co-operation:

- The **Ministry of Commerce (MOFCOM)** is responsible for the planning and management of the funds and their disbursement;
- The **Ministry of Foreign Affairs (MOFA)**;
- The **China Export – Import Bank** (Exim Bank) implements preferential loans for industrial and infrastructure projects.
- The **China Development Bank** (CDB) has launched the China-Africa Development Fund (CAD Fund) to support Chinese enterprises involved in direct investments in Africa. The bank is particularly active in Central Africa. The China Export and Credit Insurance Corporation (SINOSURE) supports Chinese exports and investments abroad by insuring its clients against a wide range of risks (e.g. commercial risk, country risks linked to trade restrictions, nationalisation or armed conflicts, and so on). Local governments, in particular district and county governments, have become important actors in the decentralised management of Chinese development aid towards Africa.

- **The Chinese Young Volunteer Corps.**

Chinese development assistance has become important and is continuously increasing. According to Alden (2007:6) and Strange (2013:15) the annual inflow of Chinese aid to Africa is about 44 per cent of the total, corresponding to US$ 1 -2 billion (Chauvet *et al,* 2007; Christensen, 2010; Bräutigam, 2011). In addition, in 2009 the majority of aid went to Africa (45.7 per cent attributed to 51 countries), followed by Asia (32.8 per cent to 30 countries) and Latin America and Caribbean (12.7 per cent to 18 countries); Oceania accounted for four per cent in the regional share and others are listed as receiving 4.5 per cent (Grimm, Rank, McDonald & Schickerling, 2011).

However, since the 1990s it is possible to observe a decrease of grants and an increase of loans. In 2006, the total of loans and credit lines was estimated at US$ 19 billion and the main recipients were Angola, Equatorial Guinea, Gabon, Nigeria, Congo-Brazzaville (Jacoby, 2007). Except for Nigeria, most of the main recipients of Chinese aid in the continent are Central African countries.

These estimates seem to support the claim that the aid strategy of new donors from emerging markets (BRICS), at least in the case of China, tends to follow the same pattern of traditional donors, as its main objective is to reinforce economic power and geopolitical presence in the host country. Even if it is difficult to measure Chinese commitment in Africa, given the lack of information on aid amounts, it seems that project aid represents the main component of Chinese economic assistance, which is essentially bilateral and in the form of loans. This element explains the reason why Beijing regularly proceeds with debt relief in favour of its African partners (Chaponnière, 2007)[iv]. According to this author, Chinese aid is channelled by the China Exim bank, the China Development Bank and sometimes by Chinese Embassies, and is used to finance infrastructures. Therefore, Chinese foreign aid differs in several ways from DAC classification, as we can see in table below (Grimm *et al*, 2011).

The so-called Chinese "package financing" means that development finance

often consists of agreements that mix aid and investment, and/or concessional and non-concessional financing. Chinese state owned enterprises also blur the line between official government finance and private flows, with FDI or joint-ventures coming from firms that are either private or state-owned (Strange *et al*, 2013:14, Grimm *et al,* 2011).

1.2 Duality of the Chinese aid financing model

In the financing mechanisms of Chinese assistance towards Africa, it is possible to identify two distinct approaches depending on the type of infrastructure to be supported. Indeed, public goods for social services provision (for example, hospitals, water, schools, universities, and so on), public buildings (for example, parliaments, ministries, stadiums, and so on) and technical assistance are financed by grants and loans with zero or low interest rates with the possibility of debt renegotiation or cancellation. On the contrary, industrial projects (for example, oil and mining projects, projects in the manufacturing sector, and so on) and economic infrastructure

Table 1: Overview of differences in counting aid between China and DAC member States.

Included in Chinese aid but not in DAC member statistics	Reported by DAC members, but excluded from Chinese aid figures
Construction of sport facilities	Cost for foreign students
Military assistance	Debt relief
Subsidised loans for joint-ventures and cooperatives projects	Costs for first year refugees in the donor country
	Administrative costs for aid
	Parts of loans that are commercial

Source: Grimm et al. 2011 :7

projects (for example hydropower, schemes, railways, roads, airports, telecommunications, and so on) are financed by public financial institutions (in general by China Exim bank) and investors. In this case, the financial tools used to deliver FDI are loans at preferential rates and trade credits, with repayment consisting of buy-back contracts, which are awarded to recipient countries, mainly those rich in natural resources, through package deals following the so-called "Angola model" (see Dzaka, 2011:211-213; Guérin, 2008:5; Reisen, 2007:3; Davies, 2008:53-54).

2. Impact of Chinese aid on the transfer of knowledge towards Central Africa

As emphasised by Vicente (2003:9), knowledge-based economies result from a shock and a tight relationship between the tendency to increase the part of intangible capital (such as, education, training, human capital, R&D) and the diffusion of ICT (such as, internet and telecommunication infrastructures). This relation has modified the sources and the speed of innovation and technology progress.

Since the 1990s, economic growth has been sustained by intangible capital, which has soon become the main source of technical progress and increasing labour productivity thanks to the rising role of training, capital productivity (infrastructures, machines, work division), and R&D. The evolution of this form of capitalism has firstly concerned OECD countries, but increasingly, emerging countries (not least so the BRICS group) are also experiencing this dynamic. Emerging countries seem to combine the conditions of the first industrial revolution in Europe, characterised by the spread of wage labour at low cost, and the conditions of a knowledge-based economy, with highly qualified jobs in hi-tech sectors and the creation of innovative enterprises.

China has an impressive scientific and technological potential. Chinese R&D expenses have represented more than one per cent of GDP since 2000 and, in absolute terms, the country ranks third in R&D spending after the USA and

Japan[v]. According to the OECD (2006), China was the second largest scientific country in the world with 800,000 researchers after the USA (1.3 million researchers). Nonetheless, in relative terms the country showed a severe gap when compared to developed countries, with 750 engineers per million of habitants against 1,000 engineers in OECD countries (Africa only has 83 engineers per million people) (Sautman, 2007, 32). In order to bridge this gap, Peking, has recently reformed its universities, following the American model. MBAs are organised in collaboration with international partners. As a consequence, two thirds of the 130 000 Chinese students enrolled abroad are based in the USA[vi], while more than 3 million Chinese students attend local universities. Therefore, China is able to transfer knowledge and know-how through the channels of technical assistance, construction projects and FDI, mainly in the form of joint ventures.

2.1 Technical assistance and transfer of knowledge

With reference to the domain of technical assistance (TA), Chinese aid tends to focus on human capital building by sending experts, especially on "health missions" and "agriculture missions", and training African students in Chinese universities.

2.1.1 Health sector

Since 1960 up to 2007 more than 20 000 experts in health care were sent on missions throughout the African continent (Mohan and Kale, 2007:12). Chinese commitment in the health sector has been reconfirmed during the FOCAC meeting in 2012, with 1500 experts expected to be sent on mission between 2013 and 2015[vii].

In general, Chinese health missions include twenty physicians per country who are assigned to work in public hospitals, usually constructed by Chinese enterprises during the 1980s. Following our observations, there are two public hospitals in Gabon, one in Libreville and another in Franceville and they are managed by Chinese physicians. In Congo-Brazzaville, there are five public hospitals (three in Brazzaville: Makelele, Talangaï, Mfilou and two in the hinterland: Owando in the north of the country and Louandjili in Pointe-Noire, in the south), which benefits or have

benefited from Chinese health TA. Thanks to professional, relational and cultural proximity, local physicians have been initiated to Chinese medicine practices. Hence, since the year 2000, Central Africa has experienced the creation of many private Chinese clinics managed by Chinese health staff or practicing of Chinese medicine (traditional and modern medicine using Chinese drugs based on medicinal plants), with more competitive prices compared to those of other clinics[viii] offering the so-called western medicine. Other than the best value for money, Chinese medicine is popular in African countries as it tends to facilitate the process of rehabilitating local and endogenous knowledge and know-how, which still uses natural remedies. In addition to the legal recognition of the importance of traditional medicine, Sino-African co-operation projects have been launched with the help of the World Health Organisation and are mainly based on the exchange of experience between African and Chinese experts in order to promote traditional medicine in the context of Sub-Saharan Africa (SSA) and to maximise the contribution and complementarities of both types of medicine (traditional and modern medicine)[ix]. As noted by Meyer (2006:6), these projects are in line with a more general approach of active preservation of cultural and biological diversity.

2.1.2 Agriculture

As far as Chinese agriculture technical assistance is concerned, estimates show that between 1960 and 2007 more than 10 000 experts in agriculture (Mohan et Kale, 2007:12) have been involved in aid schemes, while 40 African countries and 200 agricultural projects have benefited from an intense process of transfer of knowledge through the implementation of agricultural demonstration centres, sometimes in partnership with FAO, aimed at boosting the activities of small local farmers. During the FOCAC meeting in November 2006 in Beijing, it was agreed to create 10 special agricultural technology demonstration centres in Africa, one of which in Congo-Brazzaville and another one in Angola, and to send 10 000 Chinese experts to contribute to the training of agricultural technicians in

recipient countries for the period 2006 to 2010. According to Katusevanako (2002:59-69), in DR Congo, Chinese agricultural TA has allowed the creation of 17 agricultural centres around Kinshasa and in other provinces. In collaboration with local technicians, Chinese engineers were in charge of managing the centres and counselling the neighbouring farmers.

From 1960, in Congo-Brazzaville, Chinese agricultural TA has resulted in the spreading of product and process innovations from Kombe, a public farm and a training centre, and in the dissemination of agricultural techniques in the neighbourhood of Brazzaville. Due to armed conflicts and the shift of agricultural policies towards the abandonment of public farms, this centre has been closed since the 1990s. However, its activities were resumed in 2012 with the support of Chinese technical assistance[x]. In addition to its training mission, the focus will be on the production of livelihoods, such as cassava, the main meal of Congolese people. Sino -African collaboration in the field of agriculture will be further strengthened in 2013 -2015, according to the commitments made at FOCAC 2012 entailing missions of experts and academics, the creation of new demonstration centres, and the support given to projects implemented by FAO[xi].

2.1.3 Education and professional training

In addition to medical and agricultural missions, experts involved in Chinese TA facilitate the transfer of knowledge thanks to their involvement in higher education and scientific research in host countries. The Secretary General of the China's African History Academy stressed that between 1956 and 2003 China has deployed 523 professors in 35 African countries in order to teach courses in more than ten scientific and technical areas (in areas including, mathematics, physics, engineering, agriculture, and so on) both at secondary and higher education level (Xinhua Net, February 4, 2007). Furthermore, between 1995 and 2003, China has delivered 43 training sessions within the Advanced Education and Scientific Research Program in partnership with 21 African countries, including Congo-Brazzaville. Under the programme's framework, 21 laboratories have been implemented in the following dis-

ciplines: biology, micro-biology, computer science, physics, analytical chemistry, conservation and transformation of food products. During the 1980s, ten Chinese professors were assigned to the University of M. Ngouabi in Brazzaville, mainly at the Faculty of Sciences, while another five received an assignment in Gabon[xii]. Chinese commitment in the education sector is expected to be maintained over the period 2013 to 2015, as announced during the FOCAC meeting in 2012: in addition to the 20+20 Co-operation Plan for Chinese and African Institutions of Higher Education, Peking has pledged US$ 2 million per annum to support UNESCO projects in Africa[xiii].

The training of African students and professionals is another channel of transfer of knowledge from China to Africa. According to Sautman (2007:22), from the 1950s to 2004 about 18 000 African students were received in Chinese universities with a grant of the Chinese government. During the FOCAC meeting held in November 2006 in Beijing, President Hu Jintao promised that from 2009, the annual number of African student scholarships granted by the Chinese government would increase to 4000, financed through the African Human Resource Fund, compared to the previous 2000, with an average of 40 to 80 grants per country and about 400 granted to students per year for Central Africa. These figures are expected to increase up to 5500 starting from 2012. According to the Chinese Ministry of Education, the share of African students did not reach 3 per cent of total of foreign students in China in 2006, compared to about 7 per cent in USA and 50 per cent in France. Furthermore, most of African students who have graduated from Chinese universities go back home due to administrative constraints in the host country, thus without contributing to the "brain drain" and in contrast to their colleagues studying in the OECD countries, who constitute an important scientific and technical diaspora. For many African graduates who go back to their countries, employability is facilitated either by recruitment in the public sector (in particular in education and health) or by the presence of Chinese investors in their country of origin, especially through joint ventures in oil and mining sectors and in services with high added value (for example tele-

communications and computer engineering). Another factor that certainly plays a major role in easing their integration in local labour market is the limited number of students or workers with Chinese language skills.

2.2 Commitment of infrastructural projects by Chinese multi-national firms and reinforcement of local learning capacity

The main part of Chinese aid to Africa is in the form of project aid and is primarily based on physical and infrastructural projects, thus facilitating partnership with countries rich in natural resources through package deals on the basis of the Angola mode: oil and mining contracts in compensation of infrastructural projects and joint ventures (Dzaka, 2008:2011). According to a study by the Centre for Chinese Studies (CCS, 2007), the majority of Chinese firms operating in Africa in the construction sector are public enterprises (for example, China Overseas Engineering Corporation, China Roads and Bridges Corporation, China Railway Construction, and so on) and they benefit from the political and financial support of the Government. In order to win procurement bids for infrastructural projects, Chinese contractors have to offer competitive conditions: they usually set a price 30 per cent lower than those proposed by other competitors made possible by low labour and equipment costs imported from China (Severino, 2006)[xi]. In addition, these contractors normally benefit from the Government's financial support through a package deal, with the China Exim bank playing a central role as stressed above. To a lesser extent, financial contribution is also provided by bilateral or multilateral international donors, such as World Bank, African Development Bank, Saudi Arabian Foundation, and Kuwaiti Foundation through co-financing agreements. According to Chen *et al* (2007), up to 2007, Chinese groups had the second biggest market share (21.6 per cent) of the construction sector, just after Europe (49.3 per cent, with French groups taking 23.9 per cent of that share). Table 2 presents the major projects committed or in progress in Central African countries with the financial support of the China Exim bank.

2.2.1 New forms of inter-enterprise co-operation

As emphasised by some studies (Dzaka, 1995, 2008), the joint venture is the most advanced form of inter-enterprise partnership with respect to other new forms of international investment (for example management and technical assistance, franchising, and so on), and the advantages for local partners in terms of transfer of knowledge and know-how are huge. As a matter of fact, foreign investors seem to be more interested in the transfer of knowledge and know-how in favour of local partners when involved in a joint venture, owing to their long term financial commitment as stockholders or administrators. In addition, thanks to its multi-cultural dimension, the joint venture is an essential vector of knowledge and know-how sharing which could induce the organization to better economic and social performances.

In contrast to the implantation strategies in the construction sector used in the rest of the world, in Africa Chinese multi-national firms usually choose forms of market penetration such as representative office, agency, strategic alliance, rather than joint ventures. Therefore, their impact in terms of transfer of technology and know-how in host countries is generally limited as shown by several authors (Davies 2008; Ajakaiye, 2006; Boungou Bazika, 2008). Indeed, in Central Africa or elsewhere on the continent (except South Africa), local firms in the construction sector tend not to be major rivals for Chinese groups since their technical and financial capacities are limited, as well as their endowment of skilled labour. Thus, Chinese multinational firms are less interested in creating joint ventures with enterprises in the host countries and seem to rely mainly on imported labour from China to implement infrastructural projects. According to Chen *et al* (2007:460), these multi-national firms use about 48 per cent of Chinese workers against 51 per cent of African workers and one per cent from other countries. The disequilibrium is more substantial when analysing the distribution of qualified workers involved in Chinese firms' management. Estimates show that 91 per cent of their management positions are dominated by Chinese

technicians against only eight per cent of positions held by African nationals and ne per cent by technicians from other countries (Chen *et al*, 2007). According to available data, the latter category is constituted by high qualified workers from OECD engineering groups who are assigned to duties of technical control and work oversight in accordance with international standards. Nonetheless, it is important to remind that these figures may not be too distant from the average recorded in enterprises from OECD countries investing in Africa. This trend could be also detected with reference to other infrastructural activities with higher added value, such as ICT, in which Chinese groups are favourable to establish joint ventures with local and public partners and usually have the majority of equity. Hence, as noted by Mainguy (2004:12), the incidence of FDI in terms of transfer of knowledge and learning effects in host developing countries depends on local capacity of absorption, on the adequacy of the provided technology to country needs and on the competence of salaries among others. There is a large agreement in the literature that vertical links between providers and clients are the best channels of technology and trade information diffusion. From their side, multi-national firms allow providers to improve the quality of inputs and reduce delays. Therefore, the technological gap between foreign and national firms should be minimal in order to enhance FDI's positive impact on the economy of the host country. This consideration provides further evidence of the role of joint ventures and public investments in education, R&D and professional training.

2.2.2 Importance of capacity building in knowledge assimilation

As highlighted by Hoyrup (2004), human capital accumulation is channelled by continuous training of workers through public and private institutions offering training programs, as well as by professional training proposed by the firms to their employees.

Learning-by-doing is another source of improvement of competences. As a matter of fact, the prolonged co-existence of Chinese and African workers (in general from two to five years)[xv] is translated in a community of practice in which best experienc-

es are shared and learning is channelled through a dominant conversion mode of "knowledge socialisation" type (Creplet, Dupouet, Kern and Munier, 2004). These authors define a community of practice as a group of people interacting on the same practice and regularly exchanging experiences. The objective of its members is to develop their competences in a specific craft or profession. In this perspective, communities of practice can be viewed as a means to improve individual competences. For example, Chinese multi-nationals working in Congo-Brazzaville in the construction sector (the case of China Jiangsu International Economic Co-operation) have created centres of accelerated professional training in partnership with the Ministry of Technical and Professional Education lasting less than one year in order to face the lack of local skilled workers and facilitate professional insertion of young Congolese as independent workers. Following this pattern, an agreement was signed in 2007 for a concessional loan of US$ 8.5 billion from China to the DRC[xvi]: it was based on the "Angola mode" and translated in the creation of Sicomine, a joint venture between the local and public enterprise Gecamines (32 per cent) and a consortium of Chinese enterprises (68 per cent), including the China Railway Engineering Corporation and Synohydro Corporation. The terms of the agreement establish that only one fifth of workers can be Chinese and, in each project, 0.5 per cent of investment must be spent for the transfer of technology and the training of Congolese workers. In addition, it is expected that Chinese contractors award 10 to 12 per cent of activities to local firms.

Finally, with the modernisation of economic and social infrastructures especially through Chinese aid, Central African countries have new opportunities to improve the attractiveness of their ***territories*** *vis-à-vis* other investors and to diversify their productive basis with a good political and economic governance, meaning a better management of the country risk.

Another necessary condition to benefit from these opportunities is to strengthen a strategic vision of development in contrast to a predator approach which

would be unable to avoid the Dutch disease, in other words, the natural resource curse caused by the current boom of raw materials in the world market driven by the increasing demand of emerging countries, especially China. China has been the top oil importer since 2013, surpassing the USA (Financial Times, March 4, 2013). China imported close to 50 per cent of its oil consumption in 2006 after becoming a net importer in 1993. Currently, China ranks as the largest trade partner of Africa, before the USA, with a bi-lateral trade with the continent reaching the peak of US$ 120 billion in 2010 compared to from US$ 10 billion in 2000 (Le Goff, 2012). As stressed by Lafargue (2006), Beijing considers the continent an interesting match of energy and mining raw materials necessary to its economic growth.

Conclusion and recommendations

Chinese assistance has certainly changed the pattern of donors, offering recipient countries the historic perspectives to get connected with one of the motors of the world economy. In fact, without recalling the debate on the "Washington consensus" versus the "Beijing consensus"[xvii], it is possible to assert the growing role of Chinese aid since the 1990s. Even if these forms of aid do not rely on the same criteria followed by traditional DAC donors, they have altered the "cartel" of international creditors and lenders. Its effectiveness in terms of impact on recipient countries seems to be huge, but not limited to the provision of public goods, such as the construction of physical infrastructures and the development of human capital. As a matter of fact, it tends to valorise local workers appraisal in public and private structures, through the creation of professional centres and the training of African students in Chinese universities in order to fulfil the needs of Chinese multi-nationals in Africa. In particular, the training activities carried out in the sector of technology, construction and telecommunication constitute the main difference in comparison to the behaviour of western firms, while Chinese technical assistance through medical and agriculture missions allows the transfer of know-how towards African physicians and agronomists.

This paper has shown that Chinese development co-operation has a positive impact

on oil and mining countries of Central Africa in terms of transfer of knowledge and know-how mainly thanks to technical assistance, but its effects are limited due to the weakness of the autonomous capacity of assimilation of concerned countries.

In order to improve their capacity of knowledge and know-how assimilation, Central African states would have to abandon their predator behaviour and transform the lack of a long term vision into a developmental public behaviour. The region should take advantage of the opportunity offered by Chinese multinational firms as the enterprises involved insure the implementation of economic and social infrastructures as well as the capacity building process.

Nonetheless, Central African countries should consider a three-fold challenge. Firstly, there is an imperative need to modernise physical infrastructures and encourage human capacity building by optimising the impact of Chinese aid within the framework of the win-win strategic partnership, among others. Some evidence emphasise the need of involving other emerging countries (not least: BRICS), especially India which is endowed with an important scientific and technical potential and has an important and ancient diaspora in eastern- and southern-Africa, as well as traditional donors. The second broad and continuing challenge is to transform a rent-seeking economy into an economy based on high added value sectors by rationally using oil or mining rent for capacity building. This approach would support the path towards the development of a knowledge and know-how-based economy, a crucial step for the improvement of comparative advantages in the world market. Finally, the third challenge is to reduce the negative environmental effect of projects financed by China. Consequently, a future research path would be the analysis of Chinese aid impact on sustainable development in recipient African countries.

End notes

[iv]See Chaponnière, J.R. (2007), *La Chine: une aide difficile à mesurer.* La Lettre des économistes de l'AFD, no 15, pp. 2-3. According to the author, the estima-

tion of Chinese ODA can be obtained from the difference between the value of the "economic co-operation" with foreign states estimated by the Chinese Ministry of Commerce (MOFCOM) and the amount of multi-lateral financing which involves projects financed by the African Development Bank (AfDB) or the World Bank in which Chinese enterprises act as contractors (that is, 25 per cent of projects financed by the AfDB and 15 per cent of projects financed by the World Bank).

[v]See Ministère de l'Economie, des Finances et du Budget (2004), *La Chine, la longue marche vers la société de prospérité moyenne*, Paris, Octobre, p.29

[vi]Estimates show that 25 per cent of 10 000 foreign students who receive an American PhD in science and engineering each year are Chinese, while only 11 per cent foreign students are Chinese in the total. Furthermore, China has provided the biggest share of the 86 000 non-American professors and researchers employed by American universities in 2001-2002, that is 18 per cent (See Ministère de l'Economie, des Finances et du Budget, 2004, *Chine, la longue marche vers la société de prospérité moyenne*, Paris, October, p. 29).

[vii]http://www.focac.org/eng/ltda/dwjbzjjhys/hywj/t954620.htm

[viii]In general the price of a medical consultation in a Chinese clinic is 50 per cent lower than the price of other clinics. In Brazzaville, for example, the fare is 2,000 CFAF (3 €) in a Chinese clinic, compared to 5,000 CFAF (about 8 €) in other clinics.

[ix]For example, considering medical co-operation between China and the DRC, the agreement signed in December 1999 in Beijing planned the creation of a centre of training and experience exchange in the medical and health domain as well as the creation of modern facilities to manufacture drugs using local medicinal plants. See Katusevanako (2002:64).

[x]The agreement was signed in May 2008 in Brazzaville by the Congolese Minister of Agriculture and the Ambassador of China in Congo. This agreement is in accordance with the measures taken during the China – Africa Summit in Beijing in No-

vember 2006. This Summit established the creation of 14 demonstration centres on agricultural techniques in Africa, one of which was due to be constructed in Congo-Brazzaville. See *Les Dépêches de Brazzaville*, no 474 of Tuesday May 6, 2008:4.

[xi]http://www.focac.org/eng/ltda/dwjbzjjhys/hywj/t954620.htm

[xii]See Centre for Chinese Studies (2007), *China's engagement of Africa: preliminary scoping of African case studies (Angola, Ethiopia, Gabon, Uganda, South Africa and Zambia).* University of Stellenbosch, November, p. 88, www.ccs.org.za

[xiii]http://www.focac.org/eng/ltda/dwjbzjjhys/hywj/t954620.htm

[xiv]For example, according to CCS (2007: 26), a Chinese engineer working in Angola is paid US$ 130 per month against US$ 780 for an Angolan engineer working for a rival Portuguese firm. In addition, 50 kilograms of cement imported from China costs US$ 4, compared to US$ 10 for cement produced locally in the DRC and US$ 20 in Congo Brazzaville. Finally, according to Chen et al (2007:459) a bulldozer made in China costs US$ 100 000 compared to US$ 300 000 for a bulldozer made in an OECD country.

[xv]On the one hand, commutation between the two groups of workers is facilitated by the use of African translators, usually students at Chinese universities, on the other hand by local linguistic immersion of Chinese workers, facilitated by a long time presence in the host country. In particular, for Lusophone countries like Angola, Chinese workers are recruited preferably in Macao, a province under Portuguese dependence before its reintegration into China, as was the case of Hong Kong at the end of the 1990s.

[xvi]In compensation with this loan offered by the China Eximbank, China was awarded with a contract of exploitation of mining resources of the DRC (8 million of tons of copper, 200 000 tons of cobalt and 372 tons of gold). During 15 years, Sicomin will produce 10 million tons of copper in order to reimburse US$

12 billion for mining and infrastructure investments. The cost of infrastructures is US$ 6.5 billion of which US$ 3 billion in rail transport projects, US$ 2 billion in roads, US$ 758 million devoted to social projects including two universities, 32 hospitals and 5000 social housing. The commitment of these projects is reserved to Chinese contractors.

[xvii]For Jean-Michel Severino, General Director of the French Aid Development Agency (AFD April 2001-April 2010), the two policies have similar objectives: stability, development and reforms, but the order of priority is different. Beijing gives priority to stability as a prior condition to development, while Washington considers that reforms have priority. See *La Chine s'installe en Afrique*, Le Monde, October 17, 2006.

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