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Renminbi's misalignment: A meta-analysis

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A R T I C L E I N F O

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A B S T R A C T

This paper presents the results of a meta-regression analysis of empirical estimates of renminbi misalignments. Seventeen articles and 130 observations dealing with empirical estimates of the misalignment of Chinese currency are collected. This meta-analysis shows that real exchange rate measures and econometric methodologies have a significant negative impact, whereas data characteristics, dissemination procedures and the underlying theoretical exchange rate models all have significant positive impacts on measures of the misalignment of the Chinese yuan. However, this research shows that empirical methodology induces larger values on the supposed misalignment of Chinese currency than the theoretical model of the real equilibrium exchange rate. Therefore, just one empirical estimate is not sufficient for a full understanding of the misalignment of the renminbi. Instead, a correct evaluation of renminbi misalignment should combine all the theoretical models of real equilibrium exchange rates with various econometric methods.

1. Introduction

For many years, empirical studies about the Chinese renminbi[1] (RMB hereafter) have been trying to estimate real misalignments of this currency. There is an extensive literature that analyses motivations of China's exchange rate policy (Corden, 2009) and tries to address this issue. The amplitude of the deviations in Chinese currency compared to its fundamentals is very large; most studies show a significant misalignment of Chinese currency that ranges from −66% to almost 162%. Dunaway et al. (2006) conclude that this misalignment range is driven by numerous factors, including real equilibrium exchange rate models, econometric methodologies, samples of countries, choices of variables, methods of construction and the frequency of the data.

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[1] The renminbi is the currency of the People's Republic of China, while the yuan is the unit of account. The terms "renminbi" and "yuan" are generally used interchangeably to refer to China's currency.

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The present study is a review of the literature addressing the misalignment of Chinese currency. Instead of a narrative review, such as Das (2009), which might fail to provide powerful arguments about such large misalignments, a rigorous synthesis of this literature is carried out using meta-analysis techniques. Meta-analysis is a frequently used technique in medicine and in behavioural sciences such as education and psychology. According to Stanley and Jarrell (2005), meta-analyses can explain differences in the results obtained from multiple studies. Florax et al. (2002) argue that the objective of this quantitative synthesis is to obtain general conclusions from the many different results found in the entire set of studies that has been published on a specific topic. Meta-analysis is an important tool for understanding the reasons behind the diversity of the results obtained because it has more explanatory power than a narrative review of the literature would.

The first meta-analysis in economics was applied to the field of environmental economics. Stanley (2001, Table 1), Abreu et al. (2005), Dalhuisen et al. (2003) and Jarrell and Jarrell (2004) have all made recent contributions to this body of literature. The *Journal of Economic Surveys* devoted a special publication to meta-analysis (2005, 19, 3). This set of themes arouses keen interest. Of the most recent studies dealing with international economics, some are related to multinational firms (Görg and Strobl, 2001), some to the real exchange rate or business cycle correlation among Central Eastern European Countries (Égert and Halpern, 2006; Fidrmuc and Korhonen, 2006), some to the effects of a single currency on international trade (Rose and Stanley, 2005), some to monetary policy (de Grauwe and Costa Storti, 2004), and some to the effects of fiscal policies on long-term growth (Nijkamp and Poot, 2004).

The objective of this article is to synthesize information about yuan misalignment. This statistical technique makes it possible to detect the systematic influence of various characteristics of the studies on the estimated misalignments of Chinese currency. This article is organized as follows. The next section details the methodology for this meta-analysis. Section 3 presents and discusses the results of the meta-analysis. Section 4 concludes.

2. Methodology of meta-analysis

Stanley (2001) describes three steps for conducting a meta-analysis. First, a database is constructed. Then, a meta-regression equation is defined. This leads to the last step: data coding.

2.1. The studies included in the sample

The first step of a meta-analysis is to collect the largest available population of studies. We aimed to include the maximum possible number of empirical studies on the subject. Three main sources were available. First, we performed several searches on the EconLit and Ebsco databases in May–June 2008 using the keywords renminbi, yuan, misalignment, undervaluation and Chinese currency. These requests were complemented by searches on the web sites of major publishers of academic journals.[2] These requests reflect only published results, rather than all studies on the subject. A second search was then carried out on standard Internet databases and the web sites of universities or research institutes known to be working on these topics.[3] Finally, those computer searches were supplemented by an examination of the references at the end of each study to identify additional empirical studies, in particular book chapters or PhD theses. These three steps ensure a certain balance between articles published in academic journals and articles extracted from the unpublished literature.

After reading, some of these articles were excluded because the information could be extracted from other articles. In particular, some literature reviews take information from other studies but are not detailed enough to be exploited within a meta-analysis framework. Some other excluded papers discuss renminbi values without empirical or econometric treatment. We therefore consider 19 articles published between 1998 and 2008 that contain a total of 187 estimates of the real and nominal equilibrium exchange rate misalignment of the RMB covering a period from 1975 to 2008. Fifty-seven observations refer to nominal bilateral values of the RMB compared to the American Dollar, the

[2] It is possible, among academic publishers, to list Elsevier, Kluwer, Springer, Taylor and Francis, and Wiley.

[3] The most well known research institutes are CEPR, IMF, NBER, the William Davidson Institute and the Peterson Institute, but numerous websites were investigated.