

Empirical Studies on Currency Crises with Emphasis upon Typological Factors

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Summary

This dissertation pursued a possibility of typological approach in crisis empirics.

Considering that the last decade was full of crises, studies on them have gained more and more importance these days. However, unlike innumerable theoretical models, the progress in the empirical literature on crises has been rather limited. Especially, empirics with large-samples have only a brief research history with less than ten years. This dissertation aims at developing a new framework incorporating typological elements. Instead of applying various theoretical models into empirics directly, the author started with investigating the dichotomy of crisis types, which has been argued by Asian researchers in recent years. The ultimate goal of this dissertation is to verify the applicability of my typological approach in a specific research field of early warning systems.

Framework

This dissertation consists of four chapters:

Chapter 1 will navigate the direction of my typological approach. This chapter is a full-fledged basic study for pioneering typological approach of crisis. It starts from the dichotomy of crisis-type, for which several academicians argue, between Latin American and East Asian types. Antecedents in the pre-crisis period are examined to identify homogeneity and heterogeneity among typical macroeconomic aggregates. Through this preliminary comparative study, candidates of economic indicators that are crucial for determining crisis types are screened. The production side of the economy is also examined with respect to relationship between growths and structural changes of industries in order to confirm heterogeneity of crises in the two regions. Fiscal implications are interrogated, which are relevant for the taxonomy of crisis. Nominated predictors are to be applied in the following empirical chapters.

Chapter 2 forms a backbone of the analysis in Chapter 1. It is a case study for East Asia, focusing on the relationship between its sustained growths and the structural changes of the economy. As a novel attempt in the literature, a dual approach is applied by investigating both economywide and intra-manufacturing structural changes in parallel. More close examination than in Chapter 1 is extended, including country-by-country analysis. Stylized facts on structural changes in East Asia will contrast the long-run stagnating economic circumstances in Latin America, which will reinforce the insight the typological approach to crisis empirics should be promising.

The outcome in the above Chapters is applied in Chapters 3 and 4 to probe empirical relevance.

Chapter 3 attempts to identify plural crisis types. It is an initial attempt in the literature to apply the crisis typology in a very large sample. It aims at exploring how different crisis types are distributed with respect to time-series and cross-sectional dimensions. Since a longer and broader sample is desirable for that purpose, I prepare a largest-ever dataset covering more than 170 economies worldwide from 1971 to 2000. Three kinds of crisis types, based on the candidate crucial predictors screened in Chapter 1, are examined as tentatively stylized crisis types. If the time-series specific or cross-sectional specific distribution is observed, application of the typological approach

in more sophisticated empirical studies should be promising.

Chapter 4 applies my typological approach in one of the frontier crisis empirics today: EWS (early warning systems). A relevant extension is applied on the standard regression approach of EWS by incorporating typological factors, and is explored if it is to improve predicting performance. The IMF's DCSD model is selected as the benchmark model. Three kinds of extended models are prepared with typological factors incorporated as dummies. Predictors screened in Chapter 1 are again applied in modeling in addition to time-series and cross-sectional elements examined in Chapter 3. Predicting performance is compared among these models, both in in-sample and out-of-sample, to probe if typologically extended models are advantageous. Selected examples from crisis-hit countries will demonstrate, in a more intuitive way, contrasting sensitivity in scoring crisis probabilities among models. If the extended models outperform the benchmark model in total, it is rational to conclude that the typological approach should be relevant in crisis empirics.

Epilogue summarizes findings in this dissertation and concludes if typological approach is relevant or not. As mentioned, each chapter contains its own novelty in the literature, while part of them is still unsophisticated. Epilogue also reviews remaining problems which should be addressed in the future. If the typological approach proves to be relevant, it will considerably contribute to improving measures to be taken for both preemptive and crisis management purposes.

Outcome

Chapter 1, a novel attempt of full-fledged basic study for pioneering typological approach, proved that the dichotomy of crises was relevant by investigating the difference between East Asia and Latin America. A comparison among antecedents of crises demonstrated that the degree of heterogeneity between the two regions broadened in the 1990s, compared with the previous decade. Growth-related indicators, fiscal deficits, and inflation topped the heterogeneity list, while the extent of real overvaluation and current account deficits failed to indicate marked difference. Budget deficits were found closely related with growth performance.

Production side of the economy was examined in parallel with a dual approach to changes in both the economywide and intra-manufacturing structures. The results confirmed unambiguous distinction between the two regions. Among the three economywide sectors, manufacturing played the crucial role. In addition to expanding manufacturing shares, East Asia realized a sustainable growth through upgrading intra-manufacturing structures, while Latin America failed to enhance manufacturing shares, which resulted in growth doldrums and chronic fiscal deficits.

When findings in the above two sides are combined, the difference between the both regions becomes obvious: a sustained growth in East Asia was realized thorough successful structural changes without fiscal burdens, while growth doldrums in Latin America were associated with lack of marked structural changes and counter-cyclical measures must have deteriorated fiscal conditions and macroeconomic vulnerability. Therefore, difference in growth, fiscal conditions, and macroeconomic vulnerability like chronic inflation could be proxies which discriminate between the two regions.

Chapter 2 focused on analyzing the long-run growths in East Asia from the viewpoint of structural changes in the production side of the economy, and obtained stylized facts about the relationships between economic growths and structural changes. A new dual approach was applied by investigating both economywide and intra-manufacturing structural changes. In the economywide analysis, there witnessed a constant decline in the E sector (= the extracting sector), quadratic U-shaped nature in the G sector (= the goods-producing sector), and a constant increase in the S

sector (= the service-producing sector) according as the income level rose.

Inside the G sector, identical with manufacturing, a stylized intra-section structural change was also witnessed. A steady decline in the L sector (= the labor-intensive sector) shares, a mixed trend in the C sector (= the capital-intensive sector) shares among economies, and a persistent expansion in the T sector (= the technology-intensive sector) shares were the general feature. This suggests that manufacturing in East Asia had incessantly been transforming into high-yielding sectors. This dual upgrading both in manufacturing as a total and in intra-manufacturing is concluded to have sustained the robust growths in East Asia.

Chapter 3 was an initial attempt in the literature to identify plural crisis types in a very large sample set. It was one of the empirical applications in this dissertation. The sample includes 178 countries (including districts). In identifying crises, the method Frankel and Rose (1986), the simplest way of identifying crises, was applied. First, the decadal and geographical distribution was examined. Crises were most frequently observed in Latin America in the 1970s. Meanwhile, it became outnumbered by Africa and transition economies in the 1980s and 1990s. Second, crisis types were identified in this large sample.

In identifying crisis-types three kinds of them were tentatively introduced: (i) the chronic “high inflation” type crisis, (ii) the “classical” type crisis à la Krugman, and (iii) the new-type crisis. Classical-type crises as well as high-inflation type crises were typically observed in Latin America and Africa, while they recently increased in number in transition economies as well. Meanwhile the pure new-type crises without high inflation nor high budget deficits were almost exclusively observed in East Asia in the 1990s, while some forerunners were found in the peripheral Europe. Thus, crisis types were found asymmetrically distributed, which provides an insight that the crisis empirics will be improved if typological factors are incorporated appropriately.

Chapter 4 incorporated the above findings in another empirical study. It was also a novel attempt to incorporate typological factors in one of the frontier crisis empirics: EWS (early warning system). A relevant extension was applied on the standard regression approach of EWS. The IMF’s DCSD model was selected as the benchmark model. An augmented version incorporated three kinds of typological elements: time-series, cross-sectional, and economic fundamental factors. The outcome of the augmented version was favorable in both in-sample and out-of-sample performance. The NS ratio (noise-to-signal ratio) and loss function were simultaneously employed in testing goodness of fit of models as well as miscellaneous measures used in the literature. The best performer proved to be the cross-sectional model, followed by the economic fundamental model, while the time-series model failed to claim distinct advantage over the benchmark. In-sample performance unambiguously improved in the 1990s compared with the previous decade. Examples for selected crisis-hit countries in the last decade also confirmed this. Compared with the benchmark model, new-type crises without sizable fiscal deficits nor high inflation were found more efficiently seized in the augmented version. Cross-term dummy models were also investigated its predicting performance. Results were not conclusive: in-sample performance markedly improved, while out-of-sample prediction was not generally favorable.

Conclusions

Through the analysis of this dissertation, the insight for the need of typological approach in crisis empirics has proved to be relevant and promising. In addition to the naïve dichotomy of Asian-type and Latin American-type crises, fiscal deficits, inflation and growth-related indicators were also earmarked as candidate proxies for discriminating discrete crisis types. These hypothetical

typologies were examined for their relevance in a couple of empirical tests. In identifying crisis types among a large sample dataset, cross sectional and time-series features emerged markedly. Multivariate empirics also confirmed the typological approach, since accuracy of crisis predictability was unambiguously enhanced especially for crises in the 1990s. It should be noted that new-type crises have become predicted more efficiently

Meanwhile, several qualifications are yet to be addressed. The best typology has not been attained, while some appropriate typologies proved to be successful. Several important crisis mechanisms such as self-fulfilling crises or contagion of crisis failed to be incorporated here. Interrelationships with other financial crises, including banking or debt crises, were neither considered explicitly. It contains much room for further extensions and these extensions will make crisis empirics more relevant.