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Prefabrication and barriers to entry—a case study of public housing and institutional buildings in Hong Kong

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Abstract

The Housing Authority in Hong Kong provides around 30,000 subsidized residential units per annum. It is the only major client in Hong Kong requiring prefabrication in its public housing construction, a policy which began in the mid-1980s. Recently, the government has started to promote prefabrication as a general principle to improve buildability, to increase quality and efficiency as well as to reduce construction wastes. However, an analysis of public tender results between 1988 and 2002 shows that the market appears to be less competitive in this housing sector than the other institutional building sector. The former mainly consists of the construction of large residential housing estates with their auxiliary commercial centres and car parks, whilst the latter are non-residential purpose-built structures such as schools and police stations, though occasionally residential quarters are constructed for the disciplinary forces. During this 15-year period, between 38% and 74% of the total annual public housing contracts, by value, were undertaken by only three contractors. Meanwhile in the institutional building sector, the range was between 24 and 61%. This raises the concern that the prefabrication requirement might have raised the market entry barriers, and probably construction costs as well. This study addressed the competition issue by measuring and comparing the Herfindahl–Hershmann indices (HHI) of the public housing and the institutional building sectors. Regression analyses of the HHIs were then performed on various measures of contract values and a dummy variable representing the public housing or the institutional building sector.

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The analyses show that prefabrication, *ceteris paribus*, is not related to HHI. We conclude that the prefabrication requirement by itself does not seem to have raised the barriers to entry to prefabricated housing construction.

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Introduction

The Hong Kong Construction Industry Review Committee wrote in its report (CIRC, 2001) that “(p)refabrication, coupled with the use of standardised and modular components, will contribute to improved buildability and should be widely promoted, with public sector clients taking the lead”. Prefabrication is promoted as a manufacturing approach to construction not to decrease construction cost, but to increase quality and efficiency, and to reduce wet trades as well as construction waste. However, as the Committee acknowledged, the use of prefabrication and modular components is not common in Hong Kong except in public housing.

The CIRC (2001) report recognized that cost was one probable cause of concern. It states that when there is sufficient labour supply, in-situ construction methods “can be more economical”. The Provisional Construction Industry Coordination Board (PCICB), that has been set up to implement the recommendations of the CIRC, noted that “despite an increasing tendency among civil engineering contractors to make use of prefabricated components, up-front investment remained an obstacle to unleash its full cost-saving potential” (PCICB, 2004). In early 2002, the government began to offer incentives to the building sector to adopt prefabrication. Non-structural prefabricated external walls, for example, are deliberately promoted as a feature of green and innovative buildings. Such walls “may upon application and subject to conditions be exempted from Gross Floor Area (GFA) and/or Site Coverage (SC) calculations under the Buildings Ordinance” (Joint Practice Note, 2002).

This paper examines and compares the market concentration of the two major public building sectors: public housing and institutional buildings. That is, it explores how the contractors shared the two construction markets, thus answering the question of whether the markets were dominated by a few contractors or not. It proposed that if up-front investment in prefabrication is a major constraint on its wider use, the construction market for public housing would be more concentrated than for institutional buildings. For example, the top three or top ten contractors might have collectively captured a total market share that was larger in the public housing than in the institutional building sector. Prefabrication has been a required component in public housing construction since the mid-1980s, but this has not been the case for the institutional building sector. The market structure of both sectors has been examined for the period between 1988 and 2002. Following this “Introduction”, the paper is divided into seven further sections. The section on “Prefabrication: the quest for quality” describes the events leading up to the adoption of prefabrication by the Hong Kong Housing Authority. The next section, “Increasing barriers to entry in precast concrete construction?”, discusses the possible sources of cost escalation due to prefabrication, the subsequent increases in complexity in public housing construction and the consequent barriers to entry. Afterwards, there is a section on “Methodology”, followed by two

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