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主 論 文 題 名 : Essays in Market Design				
(内容の要旨) This thesis consists of four essays in <i>market design</i>, which focus on both theoretical and practical issues in real-world <i>matching markets</i> such as high school or college admissions. In Chapter 1, we study <i>sequential assignment systems</i> in which objects are assigned to agents in multiple stages. While such systems are prevalent in real-life school choice and college admissions, Dur and Kesten (2019) show that these systems are neither non-wasteful nor straightforward in general. To overcome this negative observation, we consider a model in which the mechanism designer chooses an allocation schedule, i.e., in which stage to allocate each object, as well as the allocation mechanisms it uses within a system. Our analysis newly reveals that (i) in general, no allocation schedules avoid wastefulness/non-straightforwardness and (ii) a non-wasteful/straightforward allocation schedule exists if and only if the preference domain is “tiered.” This result supports practices in which the tiered domain naturally arises (e.g., Chinese college admissions practice). However, this also highlights the difficulty of sequential assignments in more diverse preference domains.				

In Chapter 2 (coauthored with Kenzo Imamura), we study a school choice model with limited commitment assumption. School choice models employ an implicit assumption on student commitment so that students never withdraw their assigned school seats. In contrast, in a practice similar to school choice (college student assignment to foreign exchange programs in Japan), we observe that such withdrawals are a major concern of the policymaker. To analyze how choice of mechanisms affects student withdrawal behavior, we construct a school choice model where each student chooses her withdrawal behavior as well as information acquisition about her preferences and preference reporting behavior. We propose a new property of and a new measure on mechanisms: *withdrawal-proofness* and *vulnerability to withdrawals*. Our results show that (i) standard deferred acceptance is very vulnerable to such withdrawals and (ii) instead, “constrained” deferred acceptance under which students can submit specific number of schools is less vulnerable to such withdrawals. These results partially describe why constrained deferred acceptance is widely used in practice.

In Chapter 3 (coauthored with Kenzo Imamura), we study matching mechanisms for student placement in public schools. The deferred acceptance (DA) and immediate acceptance (IA) mechanisms are the two standard mechanisms used in practice. While the advantages of the DA over the IA have been extensively explored in the literature, some papers have highlighted certain advantages of the IA. One of the main advantages of the IA is its ability to take into account students’ cardinal utilities. Abdulkadiroglu et al. (2011) showed that, in a stylized environment, every student is weakly better off in any symmetric equilibrium of the IA compared to the dominant strategy equilibrium of the DA. In this paper, we show that two properties—non-wastefulness and anonymity—play an important role in this welfare comparison. Specifically, we show that if a mechanism satisfies these properties, it can also make every student better off compared to the DA. An implication of this result is that many mechanisms used in both theory and practice share the same welfare property of the IA. Furthermore, we discuss mechanisms that violate either of these properties, such as constrained mechanisms and those with asymmetric tie-breaking. The welfare gains may not be achieved under these mechanisms.

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In Chapter 4 (coauthored with Onur Kesten and Morimitsu Kurino), we introduce a new framework of endogenously designing *priorities over agents*, which are crucial primitives in assignment problems of indivisible objects without monetary transfers. Motivated by the student assignment problem to exchange programs in Japan, we introduce the so-called *prioritization problem*: how does one go about allocating overdemanded goods when each agent possesses one of several attributes while priority orders are established only among agents sharing the same attribute. Other applications include rationing of medical supplies, elective surgery scheduling, visa assignment and affirmative action. We show that two types of assignment protocols stand out when basic fairness and efficiency requirements are pursued in a consistent manner when randomization is used only as a last resort.