would live with and take care of elderly parents when they have school-age children rather than infant children.

The presence of an unmarried child has a positive effect on the transition probability. There are several possible explanations for this effect. First, living only with next of kin may be more efficient than living with in-laws, in terms of managing housework and exploiting scale economy. Second, unlike married children, unmarried children may not face conflicts or obligations regarding spouses and in-laws. Lastly, unmarried children include the divorced, who often return to the parental home.

Our results also indicate a significant role of filial altruism. While income and assets are not dominating factors of coresidence, parental health deterioration (gradual deterioration for fathers and critical deterioration such as cancer and dementia for mothers) significantly increases transition probability. Health deterioration makes coresidence more costly, but children will begin coresidence without pecuniary reward. This observation supports the role of filial altruism in family living arrangement decisions. Note, however, that this finding can also be explained by cultural norms or other social pressures.

5.2.4. Other Determinants of Coresidence

The regression also confirms other relevant determinants of coresidence. The significant positive effect of children living nearby suggests the importance of relocation costs. The finding that

those families that are aware of the hardships of informal care tend to avoid new coresidence suggests that such hardships could exceed altruism and other merits. We have also found the significance of Japanese traditional primogenital culture. An eldest-son effect exists, but an eldest-daughter effect does not. The views of mothers on traditional gender roles and living in a conservative rural area increase transition probability.

Finally, we discuss significant gender differences. First, health deterioration affects transition probability in different ways for mothers and fathers. Gradual health deterioration leads to coresidence for fathers, whereas critical health conditions such as cancer and dementia are important determinants of coresidence for mothers. In the absence of critical conditions, the subjective poor health of mothers has a negative effect. The loss of a spouse has a larger positive effect for mothers than for fathers.[20] The expectation of future dependence has a positive and significant effect for fathers but a negative and insignificant effect for mothers. All of these findings are consistent with the bequest motive. Larger inheritances occur from fathers than from mothers (Suzuki, 2007), so the loss of a father has a larger effect than the loss of a mother. Accordingly, children anticipating inheritance start providing care earlier for fathers than for mothers because taking care of unhealthy mothers is less rewarding. For the same reason, the

[20] This weaker responsiveness of fathers to spousal death is consistent with the findings in previous literature (Sakamoto, 2006; Wakabayashi and Horioka, 2006; Takagi et al., 2007).

expectation of fathers is more binding for children than that of mothers. However, all of these gender differences can also be explained by Japanese patriarchal/virilocal social structures.

6. Conclusions

This study extends our knowledge about family decisions on informal care and living arrangements by examining the motives of each family member. We advance the existing literature by (1) focusing on the transition to coresidence to provide a clear framework and delineate causal effects; (2) incorporating family heterogeneity, which has been overlooked in the previous literature; and (3) employing a wide range of variables and the panel structure of the NUJLSOA, a rich and under-utilized Japanese longitudinal data.

Our main findings are as follows. First, the transition to parent-child coresidence is often associated with parental ill health, confirming that coresidence is motivated by parental care needs. Second, unlike previous studies on Japan, the evidence for the bequest motive is fairly tenuous. Third, Japanese families exhibit noticeable heterogeneity, which should be taken into consideration in future studies.

The weak evidence of the bequest motive in Japan implies that informal filial care and coresidence is an important source of support for those elderly individuals who need care but cannot afford formal care. However, the increasing burden of care in Japan and other aging societies may overreach the capacity of filial support. The relative number of children to parents

has been decreasing, and the opportunity costs of caring for parents have been growing. The disabled elderly live longer and caregivers are older. Although the Japanese traditional social structure is still functioning and facilitating coresidence for needy parents, it is certainly declining. Securing the well-being of both caregivers and caretakers will become a considerable challenge in coming decades.

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Appendix A: Summary Statistics

	Fathers				Mothers			
	No coresidence		New coresidence		No coresidence		New Coresidence	
Variables	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Shocks								
Lostspouse	0.021	0.143	0.035	0.184	0.054	0.225	0.120	0.326
HS_physical	0.055	0.227	0.122	0.328	0.042	0.201	0.120	0.326
HS_ADL	0.017	0.131	0.052	0.223	0.010	0.098	0.080	0.272
HS_dementia	0.018	0.133	0.035	0184	0.011	0.106	0.080	0.272
HS_careable	0.168	0.374	0.217	0.414	0.167	0.373	0.153	0.362
SpHS_careable	0.111	0.314	0.183	0.388	0.090	0.286	0.073	0.262
Parent								
Age	74.564	5.994	75.704	6.393	74.441	6.088	75.301	6.263
1stchild	0.431	0.495	0.557	0.499	0.473	0.499	0.547	0.499
1stson	0.687	0.464	0.783	0.414				
1stdtr					0.605	0.489	0.627	0.485
Educ	2.007	1.387	1.741	1.234	1.557	0.764	1.438	0.617
EducMissing	0.006	0.077	0.017	0.131	0.010	0.101	0.007	0.082
Rural	0.313	0.464	0.374	0.486	0.309	0.462	0.347	0.478
Wspouse	0.905	0.293	0.826	0.381	0.583	0.493	0.487	0.501
Physical	0.454	1.084	0.473	1.011	0.677	1.239	0.698	1.195
ADL	0.124	0.660	0.197	0.857	0.147	0.654	0.162	0.748
EC_dementia	0.013	0.114	0.017	0.131	0.005	0.067	0.033	0.180
EC_cancer	0.040	0.196	0.035	0.184	0.030	0.170	0.053	0.225
Subhealth	0.850	0.764	0.870	0.822	0.952	0.761	0.880	0.777
Happy	5.821	3.187	5.717	3.274	5.283	3.336	4.850	3.430
Income	3.192	1.278	3.070	1.282	2.518	1.302	2.273	1.242

IncomeMissing	0.145	0.352	0.174	0.381	0.177	0.382	0.207	0.406
Work	0.296	0.457	0.383	0.488	0.183	0.386	0.200	0.401
Employee	0.090	0.286	0.113	0.318	0.022	0.146	0.027	0.162
Sp_Work	0.163	0.369	0.217	0.414	0.179	0.383	0.127	0.334
Sp_Employee	0.019	0.137	0.061	0.240	0.039	0.193	0.007	0.082
Reasset	0.385	0.487	0.426	0.497	0.341	0.474	0.340	0.475
OwnHouse	0.795	0.404	0.817	0.388	0.705	0.456	0.620	0.487
FamilyHouse	0.017	0.129	0.096	0.295	0.057	0.231	0.200	0.401
OwnerMissing	0.049	0.216	0.035	0.184	0.069	0.254	0.087	0.282
HouseInh	0.328	0.469	0.348	0.478	0.349	0.477	0.373	0.485
Children								
C_Onechild	0.164	0.370	0.104	0.307	0.196	0.397	0.167	0.374
C_Onechildf	0.082	0.274	0.035	0.184	0.092	0.290	0.073	0.262
C_Nson	1.125	0.891	1.265	0.974	1.173	0.937	1.140	0.883
C_Ndtr	1.162	0.955	1.180	0.912	1.185	0.979	1.360	1.064
C_Educ	0.377	0.419	0.368	0.510	0.332	0.406	0.234	0.360
C_UnmarSon	0.166	0.372	0.261	0.441	0.130	0.336	0.187	0.391
C_UnmarDtr	0.098	0.297	0.200	0.402	0.124	0.330	0.193	0.396
C_Near	0.499	0.500	0.739	0.441	0.543	0.498	0.680	0.468
C_Ngchild	3.790	2.555	3.487	2.162	4.182	2.787	4.340	3.108
C_NgchildSmall	0.577	1.052	0.583	0.955	0.354	0.800	0.367	0.789
C_Birth	0.091	0.288	0.139	0.348	0.052	0.222	0.040	0.197
C_MoneyFrom	0.055	0.228	0.104	0.307	0.108	0.311	0.133	0.341
C_MoneyTo	0.085	0.279	0.122	0.328	0.090	0.287	0.113	0.318
Values and views								
BqExp_1stson	0.214	0.410	0.261	0.441	0.163	0.369	0.153	0.362
BqExp_all	0.123	0.329	0.104	0.307	0.111	0.314	0.100	0.301
BqExp_carer	0.050	0.217	0.070	0.256	0.052	0.222	0.033	0.180
BqIntentSelf	0.411	0.492	0.339	0.475	0.382	0.486	0.280	0.451
BqIntentPrimo	0.077	0.267	0.113	0.318	0.080	0.272	0.067	0.250
BqIntentExc	0.063	0.243	0.122	0.328	0.089	0.285	0.087	0.282
BqIntentNo	0.072	0.259	0.070	0.256	0.119	0.324	0.147	0.355
BqIntentOth	0.160	0.367	0.130	0.338	0.143	0.350	0.227	0.420
ViewCare	3.229	1.575	3.765	1.512	3.052	1.567	3.173	1.478
ViewExchange	4.026	1.249	4.226	1.178	3.991	1.255	3.900	1.262
ViewGender	3.695	1.443	3.991	1.386	3.487	1.542	3.847	1.325
PlanDepend	0.214	0.410	0.452	0.500	0.332	0.471	0.387	0.489
Care Experience								
CareExp	0.269	0.444	0.304	0.462	0.567	0.496	0.533	0.501
CareExpParent	0.156	0.363	0.209	0.408	0.320	0.467	0.327	0.471
CareProblem	0.090	0.287	0.096	0.295	0.248	0.432	0.193	0.396
N	1,829		115		1,752		150	

Appendix B: Full Results (NOT FOR PUBLICATION)

	Logit				Two Component Mixture			
	[1] Fathers		[2] Mothers		[3] Fathers		[4] Mothers	
	Coef	Std Err	Coef	Std Err	Coef	Std Err	Coef	Std Err
Finite mixture components:								
Type 1 (%)					14.2%		20.4%	
Age					-0.059	0.079	-0.052	0.049
Happy					-0.407	0.144 ***	-0.013	0.078
Subhealth					0.211	0.518	-0.527	0.316 *
RAsset					1.845	0.735 **	1.160	0.507 **
constant					-0.235	6.141	0.683	4.182
Type 2 (%)					85.8%		79.6%	
Age					0.102	0.037 ***	-0.072	0.065
Happy					0.297	0.107 ***	0.049	0.142
Subhealth					0.135	0.355	-1.165	0.518 **
RAsset					-1.007	0.592 *	-0.392	0.857
Constant					-18.20	3.396 ***	-4.212	5.086
Common Components:								
Shocks								
Lostspouse	0.612	0.746	1.411	0.355 ***	1.204	0.810	3.276	0.967 ***
HS_physical	0.536	0.448	0.533	0.405	1.043	0.543 *	0.464	0.823
HS_ADL	0.807	0.556	1.567	0.573 ***	1.021	0.886	3.743	1.375 ***
HS_dementia	0.208	0.563	1.621	0.508 ***	0.323	0.819	4.754	1.247 ***
HS_careable	-0.094	0.277	-0.346	0.283	-0.095	0.348	-0.538	0.457
SpHS_careable	1.001	0.296 ***	0.267	0.409	1.059	0.385 ***	0.096	0.633
Parent								
Age	0.047	0.022 **	-0.032	0.020				
1stchild	0.200	0.269	0.838	0.389 **	0.143	0.347	1.805	0.760 **
1stson	0.544	0.328 *			0.938	0.435 **		
1stdtr			-0.543	0.384			-0.566	0.731
Educ	-0.120	0.100	-0.055	0.150	-0.154	0.134	-0.345	0.322
EducMissing	0.287	0.670	-0.089	1.187	0.804	1.101	-0.098	1.507
Rural	0.273	0.274	-0.210	0.229	0.689	0.360 *	0.383	0.515
Wspouse	-0.929	0.336 ***	-0.494	0.268 *	-1.055	0.457 **	-2.261	0.653 ***
ADLphysical	-0.198	0.134	-0.084	0.122	-0.175	0.210	0.111	0.219
ADLdisable	0.261	0.160	0.042	0.288	0.482	0.278 *	-0.230	0.353
EC_dementia	0.208	0.859	2.079	0.812 **	-0.261	1.276	6.056	1.699 ***
EC_cancer	0.181	0.538	0.665	0.470	0.322	0.786	2.653	0.813 ***
Subhealth	0.036	0.171	-0.349	0.144 **				
Happy	0.001	0.040	-0.035	0.032				
Income	0.100	0.116	-0.068	0.094	0.136	0.136	-0.140	0.174
IncomeMissing	0.503	0.324	0.142	0.245	0.849	0.393 **	0.764	0.487

Work	0.349	0.286	0.058	0.271	0.497	0.398	-0.279	0.529
Employee	0.069	0.431	-0.071	0.621	-0.033	0.548	1.128	1.189
Sp_Work	0.126	0.329	0.021	0.338	-0.079	0.487	0.922	0.660
Sp_Employee	1.319	0.570 **	-1.662	1.069	1.661	0.825 **	-3.837	1.625 **
RAsset	0.176	0.247	0.125	0.222				
OwnHouse	1.543	0.543 ***	1.129	0.394 ***	1.759	0.598 ***	2.322	0.717 ***
FamilyHouse	2.760	0.692 ***	2.642	0.484 ***	2.713	0.788 ***	5.257	0.896 ***
OwnerMissing	1.332	0.718 **	1.521	0.502 ***	0.990	0.939	2.669	0.877 ***
HouseInh	-0.604	0.268 **	-0.193	0.218	-0.741	0.341 **	-0.804	0.447 *
Children								
C_1child	-0.427	0.467	0.091	0.410	-0.704	0.658	-0.872	0.771
C_1childf	-0.674	0.640	-0.386	0.497	-0.609	0.926	-1.487	0.980
C_NSon	0.030	0.192	-0.215	0.175	-0.004	0.259	-0.706	0.341 **
C_NDtr	0.065	0.191	-0.107	0.168	0.093	0.274	0.115	0.367
C_Educ	0.111	0.329	-0.506	0.296 *	0.352	0.362	-0.075	0.628
C_UnmarSon	0.654	0.298 **	0.890	0.297 ***	1.007	0.372 ***	1.294	0.526 **
C_UnmarDtr	0.796	0.327 **	0.550	0.271 **	1.348	0.436 ***	1.322	0.556 **
C_Near	1.127	0.252 ***	0.518	0.198 ***	1.423	0.340 ***	1.416	0.466 ***
C_NGchild	-0.247	0.067 ***	0.002	0.059	-0.291	0.089 ***	-0.220	0.113 **
C_NGchildS	0.179	0.093 *	0.213	0.107 **	0.303	0.141 **	0.606	0.236 ***
C_Birth	0.475	0.318	-0.186	0.467	0.947	0.427 **	-0.395	0.804
C_MoneyFrom	0.141	0.352	0.025	0.320	-0.208	0.537	-0.376	0.558
C_MoneyTo	0.245	0.331	0.232	0.310	0.526	0.451	-0.028	0.568
Values								
BqExp_1stson	0.228	0.277	-0.133	0.279	0.422	0.345	-0.295	0.492
BqExp_all	-0.446	0.356	0.129	0.313	-0.357	0.494	-0.132	0.633
BqExp_carer	0.698	0.420 *	-0.310	0.546	1.021	0.554 *	0.380	0.781
BqIntentSelf	-0.049	0.287	-0.314	0.278	0.072	0.375	-0.306	0.473
BqIntentPrimo	0.267	0.405	-0.118	0.445	0.650	0.544	-0.005	0.739
BqIntentExc	0.359	0.405	-0.128	0.385	0.663	0.508	-0.543	0.718
BqIntentNo	0.373	0.506	0.474	0.389	0.646	0.577	0.960	0.723
BqIntentOth	-0.296	0.381	0.423	0.314	-0.869	0.566	1.145	0.565 **
ViewCare	0.144	0.077 *	-0.086	0.066	0.148	0.100	-0.124	0.117
ViewExchange	0.026	0.102	-0.039	0.081	-0.055	0.121	0.045	0.155
ViewGender	0.092	0.087	0.246	0.076 ***	0.136	0.105	0.390	0.131 ***
PlanDepend	0.923	0.240 ***	0.067	0.205	1.072	0.317 ***	-0.454	0.403
Care Exprience								
CareExp	-0.229	0.354	0.013	0.265	-0.278	0.526	1.353	0.697 *
CareExpParent	0.602	0.378	0.238	0.287	0.677	0.586	-0.128	0.524
CareProblem	-0.497	0.439	-0.402	0.268	-0.459	0.619	-1.871	0.668 ***
Other								
Wave2	-0.536	0.273 **	-0.316	0.246	-0.279	0.350	-0.150	0.390
Wave3	-0.068	0.264	0.357	0.230	-0.316	0.323	0.895	0.473 *

constant	-9.470	2.051 ***	-1.137	1.645		
Log-L	-346.002		-434.609		-332.774	-421.531
N	1,944		1,902		1,944	1,902
Chi-sq stat	176.29		180.32		106.72	75.83
P-value	0.0000		0.0000		0.0002	0.0816
Pseudo R2	0.2077		0.1721			

Competition and Price Subsidy in the Australian Childcare Industry[1]

***** Preliminary [Do not cite. Comments welcome] *****

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Abstract

This paper provides the first empirical evidence on the competition environment of the childcare industry. We exploit the new data on the number of childcare centres between 2001 and 2006 and estimate an equilibrium entry model. The 2005 introduction of a new, large-scale price subsidy in Australia, the Child Care Tax Rebate (CCTR), is also utilised to test how the competitiveness of this industry has changed after this regime change. The results illustrate limited competition in this industry. This suggests that price subsidies are likely to increase the surplus of childcare providers without much improvement in consumer surplus. (98 words)

Key words: childcare, entry, competition, price subsidy.

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1. Introduction

The availability and affordability of quality formal childcare has never been as important as it is today. While the family size has become smaller, developed countries have promoted female labour participation. A growing interest in early childhood development has particularly intensified the demand for centre-based childcare, which tends to be more education-oriented. This is a drastic contrast to the world a hundred years ago, where almost all children were taken care by mothers and other informal carers such as grandparents and nannies.

The analysis of childcare from the industry point of view has so far been surprisingly limited, despite its potential significance of policy implications. The contemporary childcare industry features a high degree of government intervention. In contrast with its early stage of industry development where most of the day care service was provided by small not-for-profit family businesses run, many countries have developed campaigns for free or subsidised childcare provision to all. In such efforts, while some countries such as northern European countries provide universal public childcare, there are a number of countries, including the US, the UK, Canada, and Australia, where the private sector plays an important role in supplying childcare service, and in many of these countries, heavily subsidised, profitable markets have

emerged [CITE EVIDENCE HERE]. The knowledge of the nature of competition and market structure of the industry is critical to formulate effective government childcare policies, such as price subsidies, entry promotion, minimum quality standards, and regulations on mergers and acquisitions.

This paper provides the first empirical evidence on the competition environment of the childcare industry, using the new data on the number of childcare centres and market size in Australia from 2001 to 2006. Our analysis shows how market competition changes with market size. We also utilise the 2005 introduction of a new, large-scale price subsidy, the Child Care Tax Rebate (CCTR), as another test for competitiveness of this industry. Following Bresnahan and Reiss (1991), we focus on isolated markets and estimate an equilibrium entry model that explains the number of entrants in each market based on market size and other market characteristics. Using the estimated profit function parameters, we calculate the *entry threshold*, minimum market size necessary to maintain a certain number of entrants, which allows us to examine whether additional entry tapers the profitability of the market for firms.

The effect of the CCTR is of particular interest in this context. In general, whether a price subsidy improves social welfare depends on the competition environment of a

particular industry. On the positive side, a price subsidy is expected to enhance the social welfare through competition. First, compared to a fixed subsidy direct to providers, a rebate or price subsidy intensifies competition through consumer choice, as advocated in the school voucher argument by Milton Friedman. Second, more importantly, a price subsidy is expected to induce entry of new childcare providers. Entry enhances consumer welfare by intensifying (price or quality) competition and by offering a wider variety of choice to consumers. Entry also improves access. [4] On the negative side, first, it may cause a larger dead weight loss. Second, larger market power may allow firms to absorb a measurable part of public spending as producer surplus.[5] All in all, the competition environment of the childcare industry is the key to the success of the CCTR. In the worst scenario where firms enjoy large market power, which may come from entry barrier, product differentiation, asymmetric information, and insensitive consumer demand, and the CCTR leads to a significant market distortion and all the CCTR spending contributes to producer surplus, not consumer surplus.

[4] In addition to these efficiency-enhancing effects, a price subsidy has consequences on the promotion of female labour participation and child development and the redistribution effect for parents with a child.

[5] Furthermore, it may lead to excessive entry if there are significant fixed costs, as discussed in Mankiw and Whinston (1986). However, this does not seem significant here because, unlike the environment they considered, the childcare industry features highly differentiated products and its fixed costs appear to be small.

Australia expanded its price subsidy scheme to include privately operating childcare centres in the beginning of the 1990s. Since then, the supply of childcare provided by the private sector has surged, and it now has one of the largest private childcare sectors in the world. Recent statistics show 60% of Australian long day care centres are for profit (http://www.echildcare.com.au/about/). The rapid growth and success of ABC Developmental Learning Centres, in spite of its subsequent fallout, and other listed national chain firms suggests the potential profitability of this industry. This combination of public subsidies and private service provision, might be a preferred scheme for countries with limited administrative and fiscal capacity. The recent report by OECD (2007) argues that, for those countries, it may not be feasible to develop a fully publicly supported childcare system such as the ones provided in northern European countries.

Our findings are as follows. First, there is limited competition in the Australian childcare market. Compared to a market with a monopoly firm, markets with the second and third entrants still exhibit similar levels of variable profit. Further entry reduces the profitability gradually. Second, the fixed/entry cost of subsequent entrants appear to be larger than that of a monopolist. Third, the introduction of the CCTR has

increased the variable profit, which provides another empirical support for limited competition and/or inelastic demand in this market. The CCTR does not affect the fixed costs.

Our findings suggest that the CCTR has surged producer surplus, without much improvement in consumer surplus. Other policies that facilitate the consumer choice and promote competition, such as more extensive information disclosure, are preferred.

The rest of the paper is organised as follows: the next section describes the childcare industry and related literature, followed by the section on the theoretical framework. Section 5 shows the estimation results and the last section concludes.

2. The Childcare Industry and Related Literature

2.1 The Childcare Industry

The childcare industry has many distinctive features that suggest large market power childcare providers can potentially exploit. First, asymmetry in information on the quality of service raises search costs for consumers, which are likely to prevent

competition.[6] Parents are found to have difficulty in understanding the quality of childcare compared to trained observers (Cryer and Burchinal, 1997). It is also shown that parents use less than available information in assessing the quality of care, and often fail to get the right perception of childcare quality (Mocan, 2007). The difficulty and frustration in finding an appropriate childcare provider are well-documented in the media. Second, due to high search costs, it is difficult to switch service providers for parents and children, which could keep less efficient service providers operating and slows down competition.

Third, geographical limit and product differentiation makes the competition in this industry highly localised.[7] The service is limited to cover a certain small geographical area.[8] The type and quality of service are often highly differentiated from each other and from other types of childcare.[9]

[6] Walker (1991) analysed imperfect information as a possible source of inefficiency in the market, together with other sources such as incomplete markets and externalities.

[7] In the literature on the demand for childcare, the choice set is often defined to include several options differentiating regulated and unregulated care, paid and unpaid care, as well as centre-based care and care by nannies. A seminal work by Blau and Hagy (1998) simultaneously modelled the choice of childcare type and the choice of quality attributes (e.g., staff / child ratio, group size). They found that consumers change childcare types depending on the relative price of different types of childcare, and parents view quality and quantity as substitutes. However, it is unclear whether substitution functions enough to ensure competition across different types of childcare providers.

[8] Having a childcare centre in a convenient location is therefore an important factor affecting consumer surplus. Yamauchi (2009) shows that, after a neighbourhood gains first 15 centre-based childcare places per 100 children, a new cohort of parents becomes less likely to perceive difficulty in search for 'good quality' childcare, and more likely to be satisfied with the amount of free time they have.

[9] Walker (1991) described the multidimensional nature of childcare providers, which leads to product differentiation. For example, a childcare service could vary in terms of group size, child-staff ratio,