



THE EFFECT OF SETTLEMENT TYPE ON THE LABOUR FORCE PARTICIPATION OF NEW ZEALAND WOMEN

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Abstract

A key priority of the present government is to improve women's participation in the workforce. That education, age and reproduction decisions all play an important role in female labour force participation is well documented. What is less well understood is the role played by the geographic context in which these decisions are made – the relationship between participation and place.

The aim of this paper is to explore the way in which different types of settlement are associated with different levels of female participation in the labour force. Our findings reveal that place of residence does affect the propensity of women to engage in wage labour – over and above the standard human capital and demographic determinants. The findings are based on analysis of the 1996 census data of over one million New Zealand women of working age. We use the Statistics New Zealand reclassification of urban and rural locations to define settlement types.

A unique feature of this study is the explicit consideration of the relationship between partnership, participation and place. We find that not only does the presence of a (male) partner have a strong and statistically significant influence on female participation but that its effect is also very sensitive to settlement type. Particularly interesting is the different effect partners have on female participation in small versus large urban settings.

Introduction

Probably the single most significant change to post-war labour markets has been the dramatic increase in the labour force participation of women. One of its most perplexing characteristics however is its marked and persistent variation within countries and within regions.

The improvement of women's labour force participation has emerged as a key priority for government: ² it was given special prominence by the OECD in the 2005 OECD survey of New Zealand (Jaumotte 2003; OECD 2005) and has been reflected in economic and social policy, such as the *Working for Families* package, paid parental leave, improvements to annual holiday entitlements, and early childhood education and care, as well as pay equity (Affairs 2004).

Despite this attention we observe that the *Workshop on Labour Force Participation and Economic Growth* hosted by The Treasury, Ministry of Social Development, Ministry of Women's Affairs, and the Department of

Labour, gave only passing attention to the *geography* of participation (The Treasury 2005).

The purpose of this paper is to investigate the way in which settlement type in general and proximity to metropolitan labour markets in particular is associated with the labour force participation of women as well as the way in which these particular geographies are associated with the divisions of labour within households.

Outline

Our paper begins with a summary of the literature on the relationship between place and participation. We then introduce the data, the regression model and define each of the variables. The variation in female participation rates over categories of settlement is then described in terms of both the likelihood and the degree of participation. We then consider the effect of controlling for the composition of the population specifically the influence of age, fertility, education and the presence of a partner. This is followed by a consideration of the way partnership affects participation and the interactions of

participation and place. Under Future Research we raise the issue of causality and how longitudinal data might help us better understand the above relationships.

The Influence of Place on Women's Labour Force Participation

In addition to documenting the effect of dependent children, education and age, the international literature has shown that female labour force participation is also sensitive to the characteristics of local labour markets (Gordon 1970; Penhale 1980; Molho 1983; Stolzenberg and Waite 1984; Lillidahl and Singell 1985; Morrison 1989; Ward and Dale 1992; Odland 1998; Morrison 1999). Stolzenberg & Waite's (1984) for example, observe how local areas have substantive and statistically significant effects in weakening or strengthening the relationship between a mother's likelihood of labour force participation and number of children.

Participation rates can vary both within and across regions for two reasons; either the demographic composition of the female population differs from one place to another (Molho 1983), or places of residence differ in the employment opportunities and constraints - in the ability of women to accommodate both child rearing and paid work for example (Odland and Ellis 2001). Other factors include labour market characteristics, such as higher wage earning potentials (Bowen and Finegan 1969; Oaxaca 1973; Gallaway, Vedder *et al.* 1991; Isserman and Rephann 1993), urban structure (Simpson 1982), and economic growth (Penhale 1980; Ward and Dale 1992; Johnstone and Pool 1996; McCall 1998).

Problems of mobility can also constrain opportunities for women to enter or extend their hours of paid work. The inability of some women to move residence in order to maximise their work opportunities contributes to differences of participation observed from place to place, particularly among women with low levels of education and wage earning capacity as noted by McCall (1998). Other place-specific differences in opportunities and constraints include the availability and cost of childcare, tertiary (re)training and the presence of social networks.

The New Zealand literature on locational constraints on women's employment began by focusing on comparisons between and within urban regions (Hyman 1979). In line with international evidence, inter-urban comparisons of participation by women with children show employment is greatest in areas with high overall labour force participation rates and strong economic growth (Penhale (1980). In a later study of regional labour markets, Morrison (1999) showed that this variation is most significant among the least-educated and least-experienced working populations for whom mobility is most constrained, a finding also supported in the international literature (Odland and Ellis 2001).

The literature also supports the theoretical expectation that women's labour force participation rises with population density (Hyman 1979; Penhale 1980; Poot and

Siegers 1992; Ward and Dale 1992; Isserman and Rephann 1993; Morrison 1999). The reasons include the existence of greater opportunities for full-time work, the concentration of tertiary sector employment in urban areas as well as the combined employment needs of career couples which require denser local labour markets.

Early UK based evidence linked high female *inactivity* with rurality and, to a lesser extent, industrial structure (Gordon (1970). Lillidahl and Singell (1985) also note a dramatic decline in women's labour force participation at the edge of cities and question how much of this non-participation is a result of family income and demographic differences, and how much the decline is a product of inadequate job opportunities.

Finally, while most studies take into account either the effect of marriage, male partner's income, or male partner's labour force position on women's participation, no studies could be found that explicitly consider the different effect partnership might have on participation in different settlement contexts.

Our review of the literature lead to four hypotheses. Firstly, that women's labour force participation would continue to vary within countries even after controlling for the demographic, fertility and educational attributes. Secondly, that one of the principle geographic explanations is proximity to the job opportunities which large local labour markets offer. A third argues that fertility, participation and location decisions are interrelated and made jointly, albeit with different lead and lag structures. To these we add a fourth hypothesis, that focuses on the importance of partners, namely that the nature of the local labour market affects the joint decisions couples make over their respective engagement in paid work.

Data, Model and Variables

In the explorations to follow we draw on census data representing over one million New Zealand women of working age, 20-65 years. Our analysis is based on special cross-tabulations prepared from the 1996 census chosen initially because of the questions asked in that census about fertility.

The decision to enter the labour force is modeled as a binary choice, initially as participation *per se* and then conditionally, that is, the probability of working fulltime *given that* some paid employment is undertaken. Weighted least squares logit regression is used to estimate the parameters. As geographers we first begin by estimating the fixed effect of settlement type and only then introduce four sets of control variables: age group of female, age group of the youngest dependent child, highest qualification of female, presence of male partner, and where appropriate, the labour force status of male partner.

The participation model may be written as:

$$(1) \quad P_{sd} = \alpha + \beta_1 D_{sd} + \beta_2 S_{sd} + \epsilon_{sd}$$

where P_{sd} is the probability that the i^{th} group of woman, in settlement type S , with attributes D , will have engaged in paid work in the week prior to the 1996 census. D and S are vectors of relevant characteristics and β_1 and β_2 are vectors of associated parameters. The conditional model applies the same equation to women who are already employed in order to estimate the probability of full-time work. A third model considers P_{uisd} , the probability of female unemployment, as a function of the same set of variables.

For estimation purposes the logit function is defined as the log of the odds ratio, so P_{sd} is rewritten as

$$(2) \quad \log (P_{sd} / 1 - P_{sd})$$

The large sample expectation of ε_{isd} is zero and its variance is

$$(3) \quad \sigma_{sd}^2 = 1 / (N_{sd} \cdot P_{sd} (1 - P_{sd}))$$

where N_{sd} represents the population for group sd .

The fact that we are estimating parameters from cross tabulated data means that the estimates refer to *groups* of women, not individual women as would be the case if we were using records on individuals. The groups are weighted according to the proportion of the population they represent so the weights are proportional to $N_{sd} \cdot P_{sd} (1 - P_{sd})$. Parameter estimates from weighted least squares logit models have been shown to be very close to those that would be obtained from individuals with the same range of attributes (see for example Li 1975) which makes using crosstabulations a quick, low cost alternative to the more expensive unit records.³ We turn now to the data set and variables in Table 1.

The set of five independent variables required for women *with* partners implies an $8 \times 7 \times 6 \times 5 \times 5 = 8400$ cell cross-tabulation. The table for women *without* partners is much smaller at 1680 cells ($8 \times 7 \times 6 \times 5$). We concatenated (joined) the two data sets to form a single multiway table of 10,080 cells. About half of these cells were empty and removing these left us with 5,477 cells.⁴ The process of 'folding' turns these n cells into n rows with each cell address uniquely identified by the 0 or 1 in the columns denoting categories of each variable.

Measuring Labour Force Participation

The five categories listed under dependent variable components in Table 1 were used to construct the three participation rates used in this paper. The conventional rate refers to the undertaking of paid work of an hour or more per week, E , plus those actively looking for work, U , divided by all those of working age, T , (20-65 in our case).⁵ In this paper we exclude those looking for work (the unemployed, U) from the numerator so our participation rate becomes simply E/T .⁶

Our conditional measure, the *full* time work rate, is the number of women working 30 hours or more per week (E_f) divided by the total number of women (20-65)

employed (E), that is, E_f/E . The third measure we explore is the unemployment rate itself, U/T .

Table 1: Variables used in modeling female labour force participation 1996

Dependent Variable Components	
Labour Force Status of Female	
Employed Fulltime (30 hrs or more per week)	FT
Employed Part-Time (less than 30 hrs per week)	PT
Unemployed and Actively Seeking Work	U
Not in Labour Force	NLF
Not Applicable	NA
Independent Variables	
Area of Usual Residence	
Main Urban Community	MUA
Satellite Urban Community	SUC
Independent Urban Community	IUC
Rural Highly Urban Influence	RHUI
Rural Moderate Urban Influence	RMUI
Predominantly Rural	RLUI
Highly Rural-Remote	HRR
Not Included	UD
Age Group of Female	
15-19 Years	A1519
20-24 Years	A2024
25-29 Years	A2529
30-34 Years	A3034
35-39 Years	A3539
40-44 Years	A4044
45-65 Years	A4565
Highest Qualification of Female	
No Qualification	NQ
School Qualification	SQF
Vocational Qualification	VQF
Post School Qualification Not Elsewhere Incl. ¹	PSQN
Degree or Higher	DHF
Not Specified	NS
Youngest Dependent Child	
Dependent Children 1-5 Years	DCLT5
Dependent Children 6-13 Years	DC613
Dependent Children 14-17 Years	DC1417
Adult Children	DCADULTS
No Dependent Children	NDC
Presence of a (Male) Partner	
	WP
Labour Force Status of Male Partner	
Employed Full-Time	FTMP
Employed Part-Time	PTMP

Settlement types

The main reason we use the Census of Population and Dwellings is the access it provides to geographic detail on the residence of households. Almost all studies which recognise the role of place in participation specify actual locations, usually regions, but sometimes urban areas or cities within them.⁷ In a departure from this practice we replace what is often an arbitrary statistical division of a country into geographic units by a classification of places

based on both their identification as urban or rural *and* their proximity to the country's largest, metropolitan labour markets.⁸ The rationale here is that it is the geographic *relationships* embodied in the settlement system which are important in understanding labour participation rather than location per se.⁹

Statistics New Zealand's recent (re)classification of rural and urban recognises that a rural or small urban centre's proximity to a main city has significant influence on the labour market opportunities of its residents. For example, a female resident in a small remote West Coast town and a female resident of a small town close to Wellington each face a quite different labour demand schedule even though the towns themselves may be of the same size. Access to facilities, services, or employment opportunities differ substantially in these two cases however and can be expected to have consequences for the division of labour between work and family and hence on participation. Under a dichotomous classification of rural or urban both towns would appear in the same category however the new classification allows the analysis to be based not only on an explicit 'urban' and 'rural' dimension but also by degree of access to the major urban labour markets.¹⁰

Demographic and Education Variables

The seven age groups listed in Table 1 use fairly conventional divisions but in order to avoid the competing effects of schooling we confine our analysis to those women in the working age years 20-65. The 'fertility' measures in Table 1 are based on the ages of the youngest dependent child, under 5, between 6 and 13, 14-17 and the presence of (dependent) adult children. The five education categories are based on the highest qualification attained.¹¹

The primary variable we use to refer to partners is the presence of a (male) partner. The remaining available variables in Table 1 refer to the labour force status of the partner, i.e. whether they are employed, and if so, fulltime or part time.

Obtaining least squares estimates for categorical variables requires the specification of a base category in each case. The base used throughout is the group of women, 25-29 years old living in Main Urban Areas without qualifications, without partners and without dependent children.

Participation Rates by Settlement Type

An initial look at participation in 1996 shows that women's engagement *does* vary by settlement type, but *not* in the expected direction (Table 2). About two thirds of women living in urban areas are in the labour force, but their participation rates are actually *lower* than those women living in rural areas.¹² This is more specifically the case for women who live in Satellite (SUC) and Independent Urban Centres (IUC) and they are noticeably less likely to be engaged in paid work. In stark contrast with the international literature, in New Zealand it is *not*

women in the more densely populated labour markets who participate most, but those women living in rural areas; their mean participation rate is 71 percent compared to 68 percent among urban women.¹³

The influence of 'rural' residence in truth depends critically on their proximity to urban centre employment opportunities. Women living in rural areas that lie just outside the main urban areas, those with a high urban influence, are noticeably *more* likely to be engaged in paid labour than those actually living in urban areas. This difference diminishes as access to the main urban markets improves but appears to rise again in the more remote rural areas, although the latter three categories in Table 2 do not reach the conventional margin of statistical significance. They are intuitively plausible nevertheless with the costs of commuting to jobs reducing the net returns to urban employment so that reliance on rural and small town employment opportunities rise with their remoteness.

Table 2: The labour force participation rates of female population by type of settlement. New Zealand females of working age 20-65, 1996.

Settlement Type		Labour Force Participation Rate	
		Mean	S.D.
Urban	Main urban area	0.695	0.202
	Satellite Urban Community	0.633	0.239
	Independent Urban Community	0.468	0.232
	Total	0.680	0.200
Rural	Rural High Urban Influence	0.739	0.221
	Rural Moderate Urban Influence	0.715	0.227
	Rural Low Urban Influence	0.712	0.230
	Highly Rural/Remote	0.721	0.237
	Total	0.710	0.230

Fulltime Employment

The labour force participation rates we have been using so far (E/T) simply indicate if the woman worked for pay (or in a family business) for an hour or more in the week prior to the census. As such this variable gives no indication of the actual number of hours worked.¹⁴ In order to capture some of the variation of employed women over the hours of work distribution we introduce the conditional fulltime employment rate, (Eft/E) the mean of which is 64%. Rates for each of the seven settlement types are shown in Table 3.¹⁵

The chance of an employed woman obtaining *fulltime* work beyond the main urban areas was noticeably lower than those residing within them. The chances of fulltime work rises the closer a woman resides to the largest labour markets. Such a pattern is exactly what one would expect from available theory and underscores the importance of measuring participation in terms of the amount of paid work. The exception to this neat pattern however are the results for Independent and Satellite Urban areas for women living in these areas show rates which are more similar to rural areas outside the commuting range of main urban areas.

Table 3: Conditional fulltime labour force participation rates by settlement type; women 20-65, 1996.

Settlement Type		Conditional Rate (Eft/E)
Urban	Main Urban Area	0.661
	Satellite Urban Community	0.592
	Independent Urban Community	0.578
Rural	Rural High Urban Influence	0.618
	Rural Moderate Urban Influence	0.599
	Rural Low Urban Influence	0.587
	Highly Rural/Remote	0.579

Table 4: Mean unemployment rates by settlement type of women 20-65, 1996.

Settlement Type		Unconditional Unemployment Rate (U/T)
Urban	Main Urban Area	0.049
	Satellite Urban Community	0.051
	Independent Urban Community	0.054
Rural	Rural High Urban Influence	0.031
	Rural Moderate Urban Influence	0.039
	Rural Low Urban Influence	0.039
	Highly Rural/Remote	0.034

Unemployment

In terms of settlement type female unemployment rates behave inversely to the participation rate: they are lowest in urban settlements and rise with distance to the main urban settlements. In this sense the spatial mirrors the temporal; see Figure 3 of the Stroombergen paper in this volume for an example. Again, breaking the neat picture is the Satellite and Independent Urban Communities, both of which show relatively higher unemployment rates, Table 4.

In summary, we have established that women's chances of employment continue to vary systematically by settlement type but each settlement type has a different relative influence depend on whether one is considering participation per se, engagement in fulltime work or searching for work (unemployment).

In general, the results are consistent with available theory. However the data used so far does not control for composition effects - the fact that settlements are occupied by women whose demographics and educational attributes alone raise or lower their likelihood of participating and working full time. A more specific test for settlement effects on participation needs therefore to control for the different mixes of women living therein.

Settlement Effects after Controlling for Composition Effects

The effect of including the vector of demographic variables (D) into the same equation as settlement effects confirms the overwhelming negative impact that dependent children, particularly those under six, have on whether a woman works at all, as well as the likelihood that she will work full time and confirms that participation also falls substantially if the youngest child is under six.

When the youngest child is 6-13 years old the negative impact on participation is slightly weaker but still statistically significant. The likelihood of a mother gaining employment increases as children become older (see Table 5).

Our results also confirm the positive relationship between education and participation; the higher the level of education the more likely a woman will enter paid work. Underlying each of these attributes is the pervasive effect of age in accounting for variation in women's labour force participation; women in the youngest and oldest age groups are least likely to be in paid work.

Entering control variables has an effect on the role of settlement type. For example composition effects diminish the likelihood of participation in Independent Urban Communities and Satellite Urban Communities to the point where they cease to be statistically different from those of the Main Urban Areas. This suggests that it was the *composition* of the female population rather than the labour demand schedule characteristic of such locations which was responsible for much of their lower participation observed in Table 2.¹⁶

In summary, Main Urban Areas attract those women with higher propensity to participate in paid work and once we control for their attributes we still find women more likely to engage in at least some paid work (or in a family business) in rural areas; in fact the different mix of women living in remote areas was actually suppressing the magnitude of this settlement effect on participation. One of the possible reasons may lie in the very definition of participation itself for it only requires that the respondent works an hour or more a week.

Table 5: Labour force participation (E/T) by settlement type controlling for demographic and educational attributes. Odds ratio, weighted least squares logit estimates. New Zealand females of working age 20-65, 1996.

Logit	Odds Ratio	t
Dependent Children 1-5 Years	0.228	-34.34
Dependent Children 1-5 Years	0.228	-34.34
Dependent Children 6-13 Years	0.457	-19.87
Dependent Children 14-17 Years	0.876	-3.10
Adult Children	1.312	6.74
Post School Qualification Not Elsewhere Incl. ¹	1.701	10.11
	1.023	0.45
35-39 Years		
40-44 Years	1.109	1.90
45-65 Years	0.478	-16.00
Presence of a (Male) Partner	1.932	23.82
Satellite Urban Community	0.884	-1.65
Independent Urban Community	0.929	-1.91
Rural Highly Urban Influence	1.255	2.64
Rural Moderate Urban Influence	1.173	2.28
Predominantly Rural	1.190	3.14
Highly Rural/Remote	1.296	2.77
Not Included	0.842	-0.16

Number of obs = 3569, F (21, 3547) = 146.84, Prob > 0.0000, R-Squared = 0.4651, Adj R-Squared = 0.4619, Root MSE = 0.7278

Participating in full-time work

Each of the variables which were important in accounting for participation per se become exaggerated when we consider the likelihood employed women will work fulltime - in both their effect on the odds of employment and in terms of their statistical significance; Table 6. The opportunities for women to work fulltime are clearly strongest in main urban areas (all the place odds ratios are significantly less than 1.0) and this result brings the New Zealand result back in line with the international evidence.

Interaction Effects

Although there are marked differences in fertility across the country the influence of dependent children of different ages has a remarkably similar effect across all seven settlement types. There is not, in other words, a strong interaction effect between settlement and fertility when it comes to accounting for participation. The odds on participation (relative to women without dependents) increases as the youngest dependent child ages regardless of settlement type. The strength of the relationships however (the t statistics) are most pronounced in the main urban areas.

Table 6: Conditional full time labour force participation (Eft/E) by demographic attributes and settlement type. Odds ratio, weighted least squares logit estimates. New Zealand females of working age 20-65, 1996.

Logit	Odds Ratio	t
Dependent Children 1-5 Years	0.189	-59.22
Dependent Children 6-13 Years	0.275	-56.45
Dependent Children 14-17 Years	0.536	-27.22
Adult Children	0.853	-6.83
Post School Qualification Not Elsewhere Incl. ¹	1.087	2.56
School Qualification	1.062	3.198
Vocational Qualification	1.194	8.67
Degree or Higher	1.496	14.40
20-24 Years	0.651	-12.76
30-34 Years	0.743	-9.46
35-39 Years	0.644	-14.04
40-44 Years	0.661	-12.75
45-65 Years	0.428	-29.33
Presence of a (Male) Partner	0.838	-9.61
Satellite Urban Community	0.818	-4.37
Independent Urban Community	0.803	-9.53
Rural Highly Urban Influence	0.878	-2.90
Rural Moderate Urban Influence	0.865	-3.90
Predominantly Rural	0.873	-4.66
Highly Rural/Remote	0.837	-3.74

Number of obs = 3023, F (20, 3002) = 350.37, Prob > 0.0000, R-Squared = 0.7001, Adj R-Squared = 0.6981, Root MSE = 0.39351

The influence of education levels on participation is also highly consistent across the settlements with participation rising at roughly the same magnitude with successive increases in the highest qualification. Interestingly, the *relative* effect of having a degree on participation is most marked, not in the cities but in the more remote rural areas. And when it comes to fulltime work, the relative strength of both vocational and degree qualifications on the probability of engaging in fulltime work rises noticeably in the Satellite and Independent Urban Centres. Both underscore the greater premium attached to education outside the main urban areas - a point we return to below.

The relative influence of age on participation is also similar across the settlements, but participation rates of older women are more likely to fall (relative to our age base) in rural areas compared to the main centres. Age also has a different influence on the participation in *full time* work across the three *urban* settlement types. Younger women (20-24) in independent and satellite urban areas are far *more* likely to be engaged in fulltime work than their counterparts in the major centres where a larger proportion are engaged in tertiary education.

The Effect of Partnership on Participation¹⁷

One of the striking features of the results presented so far is the highly significant influence which (male) partners appear to play in labour force participation outcomes of women, as Table 5 and 6 show.¹⁸ There is a high correlation between partners in their propensity to work or not to work, as well as a complementarity with the hours of work undertaken.¹⁹

Considerable attention is now being paid internationally to the implication of these relationships for household location decisions, that is to the geography of career couples (Frank 1978; Green 1995; Green 1997; Costa and Kahn 2000) as well as associated questions of family, migration and employment (Lichter 1982; Bird and Bird 1985; Snaith 1990; Shields and Shields 1993; Cooke and Bailey 1996; Bailey, Blakes et al. 2004). These studies are part of a much broader literature that is addressing the complex geography of households (Buzar, Ogden et al. 2005). In this paper we focus on the way settlement type affects the distribution of paid work across adults *within* the household.

The paper by Callister and Newell in this volume refers to the way in which the growing demand for simultaneous employment of both partners (especially those with high levels of education) render it increasingly likely that they will *have* to locate in the most dense and largest labour markets if both partners are to secure employment that matches their career aspirations (Callister and Newell 2007). If this argument is substantiated empirically then it has implications for competitiveness of different settlement types, for relocation policies and even for environmental policy - because career couples tend to commute longer distances (Green 1995).

There are six questions about the relationship between partnering, work and settlement type that are of interest here. Each addresses the extent to which a partnered woman's propensity to work is influenced by her partners employment status, controlling for demographics including fertility and education as above. The reasons for this are manifold. The partnership variable is also likely to be picking up attributes of women which are not captured in the standard set of human capital variables already in the model but that are nevertheless positively correlated with matching on both the partner and job markets. This results is consistent with both the theoretical (e.g. Becker) and the empirical assortative mating literature which shows that men and women do not partner randomly but are likely to have similar characteristics in terms of education and employment status (Del Boca, Locatelli et al. 2000; Henz and Sundstrom 2001; Baxter 2005).²⁰

Our first question addresses the employment effect of simply having a partner, regardless of whether the partner is employed or not. Table 5 showed that the marginal effect of having a partner substantially increases the likelihood a woman will engage in paid work; partnered females are almost *twice* as likely to be working (odds ratio = 1.93).

Table 7: The impact of being partnered with someone who is employed on the odds of a partnered woman being employed, 1996.

Logit	Odds Ratio	t
Dependent Children 1-5 Years	0.225	-45.56
Dependent Children 6-13 Years	0.492	-23.31
Dependent Children 14-17 Years	0.923	-2.47
Adult Children	1.197	5.22
Post School Qualification Not Elsewhere Incl. ¹	1.510	10.15
School Qualification	1.590	20.61
Vocational Qualification	2.278	30.84
Degree or Higher	2.313	22.19
20-24 Years	1.005	0.11
30-34 Years	0.958	-1.20
35-39 Years	1.062	1.61
40-44 Years	1.203	4.45
45-65 Years	0.596	-13.97
Presence of an employed partner	5.559	77.27
Number of obs = 2643, F (14, 2628) = 680.80, Prob > 0.0000, R-Squared = 0.7839, Adj R-Squared = 0.7827, Root MSE = 0.46756		

Our second question is whether being partnered with someone who is *employed* further raises the likelihood that the women herself will be employed. The answer is a clear yes, the odds of her working increase *fivefold*; an employed partner has a much greater influence on a woman's participation than partnership alone, Table 7.²¹

Our third question is whether the *amount* of work engaged in by an employed male partner influences his partner's propensity to participate. And here again the answer is a clear yes. Adding a variable representing partners engagement in fulltime work to the model in Table 7 raises the odds of a woman working over and above the fact that her partner is employed.

A fourth related question is whether, having a partner who is *unemployed* has any effect on a partnered woman's likelihood of working. The answer is no; her odds of being employed remain unchanged, suggesting that unemployment is a temporary phenomenon for most partners.

Our fifth question asks whether a partner can also have a negative effect on a women's likelihood of participation. The answer is a definite yes. A male partner's location outside the labour force significantly *decreases* the chances his partner will be in paid employment. It is possible in such cases that both partners may be students or retired although note how both the age range and the fact that all these regressions reported here have a full set of controls probably precludes such composition effects.

Our sixth question has to do with the relationship between the *amount* of work a woman is engaged in and her partnership status. Our interest here lies in testing the so-

called backward sloping supply curve effect on female participation, the argument being that if the partner is working and earning sufficiently, the woman is more likely to withdraw some or all of her labour from the market.²² The empirical issue is the point at which male engagement with the market tends to reduce female labour supply. The career couple hypothesis would suggest otherwise with the two participations reinforcing rather than countering each other.²³

Table 8: The negative influence of partnership on the propensity of employed women to select fulltime work, New Zealand, 1996.

Logit	Odds Ratio	t
Dependent Children 1-5 Years	0.190	-57.82
Dependent Children 6-13 Years	0.275	-55.29
Dependent Children 14-17 Years	0.539	-26.41
Adult Children	0.865	-6.14
Post School Qualification Not Elsewhere Incl. ¹	1.100	2.87
School Qualification	1.069	3.47
Vocational Qualification	1.203	8.87
Degree or Higher	1.545	15.32
20-24 Years	0.658	-12.22
30-34 Years	0.739	-9.41
35-39 Years	0.639	-13.98
40-44 Years	0.660	-12.65
45-65 Years	0.426	-28.91
Presence of a (Male) Partner	0.825	-10.26

Number of obs = 3023, F (14, 3008) = 471.19, Prob > 0.0000, R-Squared = 0.6868, Adj R-Squared = 0.6854, Root MSE = 0.40172

We explore two possible effects - the first being the influence which simply having a partner (employed or not) has on the likelihood that an employed woman will work fulltime (Eft/E). Interestingly the effect was strongly negative; working women were less likely to work fulltime if they have partners (even with the full set of controls in place). Table 8 shows the diminished odds on the partnership variable.

If instead we just consider the effect of those partners *who are in employment* on the chances an employed woman will work fulltime the effect is actually positive - the odds increase and the significance level is higher. Thus, while partnership per se negatively affects the likelihood an employed woman works fulltime, this is not the case when partners are themselves employed.

The Interaction of Partnering, Employment and Settlement Type

A central question for this paper in the above is whether the employment implications of partnering are affected by the geographic context. For example, does partnership have the same influence on women's employment in the

main cities as it does in the smaller towns and in the countryside?

We'll focus primarily on urban size by considering the differences between main urban areas and smaller towns (Satellites and Independent Urban Centres). This way we largely avoid the confounding differences which farm work can introduce into these comparisons.

We approached this question by running our models just for urban areas and then testing for small town interaction effects on the partnership variable. Using this approach we test whether living in Satellite and Independent centres means that the presence of working partners has a *different* effect on female participation than in the Main Urban Areas. The answer is no. While the interaction effect is positive it is not significant.

Among partnered women we then ask whether women were more likely to work if their partner worked fulltime and whether this relationship holds any differently in Satellite and Independent Urban Centres communities. Again the answer is no; the new coefficient is positive but not significant.

We then asked whether the effect of adding a partner on the odds that a woman otherwise employed will work fulltime differs according to the type of urban centre. The answer is yes; the presence of a partner has a *much greater effect* in reducing the propensity of employed women to work fulltime in Satellite and Independent Urban Centres than in Main Urban Areas. The marginal contribution of men's additional work in small towns is to *decrease* the likelihood that women will work fulltime whereas in large urban markets it is to raise it.

These last highly significant interaction effects suggest a difference in motivation for fulltime work among women in large and small cities. In the larger urban centres there are more career opportunities for women. In smaller centres a female with a partner may take on fulltime work out of necessity, so that when men secure fulltime work, women reduce their hours of work. This same result may also reflect substitution effects in Satellite and Independent urban areas - men taking most of the few fulltime jobs in such areas.

There is the possibility of course that it is not geography but the different socio-economic position of women in small and large urban areas that is operating to generate the above results. The propensity of women in Satellite and Independent settlements to withdraw their labour when their partners get fulltime work may simply reflect the lower socio-economic of women in small urban centres. In contemporary large labour markets, particularly among educated couples, men and women's paid work is less likely to be substitutable within the household. Among this stratum work is more likely to be undertaken for its own sake and enjoyment rather than simply a means of income generation to be substituted by another adult whenever possible.

We tested this socio-economic hypotheses by rerunning our previous test for two different education levels, those

above and below School Qualifications (but we had to remove the main education terms when stratifying the sample due to collinearity). We found however that the small town interaction effect *still* held regardless of whether we applied the model separately to women with a maximum of school qualifications or to those with higher qualifications. In both cases there was a significant small-town-working-partner negative interaction effect on the odds of employed women working fulltime, even among the better educated women.

Table 9: The influence of small town residency and the partner's fulltime work on the propensity of women to work fulltime on women with a maximum of school qualifications only. Urban areas only.

Logit	Odds Ratio	t
Dependent Children 1-5 Years	0.183	-28.61
Dependent Children 6-13 Years	0.268	-27.12
Dependent Children 14-17 Years	0.542	-12.96
Adult Children	0.864	-2.96
20-24 Years	1.021	0.24
30-34 Years	0.696	-5.55
35-39 Years	0.599	-7.76
40-44 Years	0.594	-7.66
45-65 Years	0.364	-15.93
Presence of an employed partner	1.203	4.00
Presence of an empl'd partner x Small town residence	0.807	-5.48

Number of obs = 565, F (11, 553) = 121.72, Prob > 0.0000, R-Squared = 0.7077, Adj R-Squared = 0.7019, Root MSE = 0.34786

Table 9 shows that within urban areas as a whole the effect of having a partner in fulltime work raises the likelihood that employed women will engage in fulltime work but lowers her likelihood of employment, especially if these women live in smaller settlements.

In the larger, denser urban labour markets the more likely it is that fulltime work will be undertaken by *both* adults in partnered households. Women living in larger cities are less likely to reduce their labour supply when partners hold fulltime jobs than their counterparts living in small, scattered urban markets. However, the fact that this is also the case for women with lower levels of education suggests that price effects in larger centres may necessitate both partners working. With urbanization the partnering markets and labour markets reinforce each other to collect productive talent in a few concentrated places.²⁴ Our results are therefore consistent with and support the evolving 'career couple' thesis being advanced by Costa and Kahn (2000).

Conclusions

What this cross sectional study of the New Zealand census data suggests is not only that the the country's settlement geography has to be factored more explicitly

into models of female labour force participation but that there are alternative ways of bringing in that geography. Our paper is unusual in its use of settlement type as an influence but this is justified by the way in which it has illuminated both the role of employment density, the proximity to the major urban labour markets and exposed the sensitivity of increased hours of participation to location, as well as the differential way partnership affects participation across the country.

We have also shown that while the key demographic influences on female participation rates continue to hold throughout the settlement system their relative strength and statistical significance can vary systematically from one settlement type to another. We have noted this particularly in the case of young women where the amount of work they undertake depending on *where* they work.

Finally, we have spent some time exploring a relatively neglected relationship, that between partnering and participation in paid work. The range of issues is considerable but one result is quite clear - women and their partners do not make employment decisions in a spaceless world. Their choice of location, work and partnership, together with fertility decisions, are all highly interconnected. It is the nature of that interconnection and its implications for urban settlement that constitutes the on-going research challenge.

Future Research

There are well known limitations to drawing inferences from cross sectional data, especially when it comes to understanding highly dynamic behaviour such as labour participation. While there are clues in the above results to the possible influence of timing in both the labour and partnership markets, any attempt to draw *causal* inferences about these interrelated processes is going to require access to appropriate *longitudinal* data.

As several papers delivered at this twelfth conference have shown, New Zealand researchers will soon be in a strong position to join their overseas colleagues in exploiting rich longitudinal data sets. By modeling migration and labour market entry, fertility and education decisions as related, sequential decisions in which *timing* plays an important role, geographers and other social scientists will be better able advance their understanding of the role that *place* plays in market engagement. Such advances will also allow other disciplines to include space in their models with a much greater degree of confidence as to its likely role in mediating the labour engagement process.

Finally, using the conventional breakpoints of 0 and 1 hours of work and over and below 30 hours is still required if cross tabulations are the only form in which data are readily available. But this dichotomization hardly begins to exploit the much richer information we actually have available from the census on hours worked. While the number of cross tabulations permissible by Statistics New Zealand has restricted full use of hours

worked in this study, access to unit record data in future should allow a much better understanding of the role of partnership on the hours worked by women as well as the geography of female participation itself. The 2006 census offers many new opportunities in this respect.

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Notes

- 1 This paper draws heavily on the Research Essay completed by Colleen Souness as part of the requirement of her BA honours in Human Geography Souness, C. (2005). The effect of settlement type on the labour force participation of New Zealand women. School of Geography, Environment and Earth Sciences. Wellington Victoria University of Wellington Research Essay in partial fulfillment of a BA(Hons) in Human Geography.
- 2 The recent OECD 2005 Economic Survey highlighted that while New Zealand's overall female participation is comparatively high by international standards, it has one of the lowest rates of employment among mothers with children under the age of six years in the OECD OECD (2005). Economic survey of New Zealand 2005: raising female labour force participation, OECD.
- 3 Although not widely used there are distinct advantages in exploring relationships in a multivariate way using such cross tabulations, apart from the fact that they are a fraction of the price and can be run very quickly by SNZ. Both time and dollar costs are considerably lower than obtaining access to unit records through the SNZ data analysis lab. Cross tabulations in 'folded' form to which weighted least squares can be applied are therefore ideal for graduate student work. Other examples in which a 'synthetic' individual level sample of workers were used to obtain estimates of disaggregated groups from cross-tabulated data Morrison, P. S., K. L. Papps, et al. (2006). "Wages, employment, labour turnover and the accessibility of local labour markets." *Labour Economics* 13: 639-663.. For an example using four successive census years to make up a panel data set see Morrison, P. S. (2005). Changing patterns of home ownership in New Zealand, 1991 to 2001. Wellington, Report to DTZ for Centre for Housing Research (CHRANZ): 1-63.. Other examples of the use of high-dimensional cross tabulations on New Zealand data include Harris, R. (1992). "Ethnicity,

gender and labour supply in New Zealand 1986." *New Zealand Economic Papers* 26(2): 199-218.

- 4 This table includes all those cells with at least one observation, one women present (randomly rounded to 3). We experimented with this threshold and found that setting the minimum cell size to 6, 9, 12 or even 15 made little difference to the overall conclusions we draw from these analyses and have therefore returned to the original number of cells, 5476.
- 5 A fairly full discussion of the hours of work distribution of both men and women was published as Appendix 5.1 in Morrison Morrison, P. S. (1989). Labour adjustment in metropolitan regions. Wellington, Institute of Policy Studies and VUW Press.. This still serves as a useful qualification to the dichotomous measures used here. Paid work definitions undoubtedly understate the participation of women in productive work in general, not just housework but any caring of children or adults outside the household in which reciprocity rather than monetary payment takes place. A much more nuanced picture of the extent of 'work' undertaken by both men and women could be obtained from the Time Use Survey. For this study we are limited by the largely international conventions that govern the questionnaire structure of the census of population and dwellings.
- 6 Our definition also excludes the Not Applicable response in the Census question. Unemployment rates are considered separately.
- 7 The rationale for including regions or location identifiers in general is often quite limited or unidimensional. Take for example the single rationale applied in a recent Treasury paper: "It is expected that the fixed cost of working is different for people in or outside our larger cities and in or out of more remote areas, in particular for people with children who may need childcare services" Kalb, G. and R. Scutella (2003). New Zealand labour supply from 1991-2001: an analysis based on a discrete choice structural utility model. New Zealand Treasury Working Paper 03/23. Wellington, The Treasury.. This may well be true, but there are many other components to the regional context that can affect participation rates. The fact that (in New Zealand particularly) 'the region' is a poor proxy for access to metropolitan labour markets is one of the reasons for the use of Settlement Types in our paper.
- 8 Note that Statistics New Zealand uses the 2001 census to undertake this classification and, by using the 1996 census, we are implicitly assuming its appropriateness for conditions five years earlier. For details of the classification see Statistics New Zealand *Statistics New Zealand* (2005). New Zealand: an urban/rural profile.

Wellington.. The resulting map may be found in <http://www.stats.govt.nz/urban-rural-profiles/default.htm>

- 9 We acknowledge the valuable conversations we have had with Robert Didham, Statistics New Zealand, on this typology and acknowledge the instrumental role he had in bringing the (re) classification to our attention.
- 10 The other approach is to use local labour markets. These are locationally specific and are defined on the basis of inward and outward commuting patterns Papps, K. L. and J. O. Newell (2002). Identifying functional labour market areas in New Zealand: a reconnaissance study using travel-to-work data. Bonn, Institute for Study of Labour.
- 11 Experimentation with the 'not specified' showed its inclusion in the base had little effect on the estimates presented below.
- 12 Of the approximately one million women of working age represented in the data, 86 percent live in urban settlements.
- 13 We tested for the statistical significance of these differences by running the settlement location variables in equation 1 only. Each settlement type was identified as a dummy (0,1) variable and compared against the Main Urban Areas, Table 3. The lower Satellite and Independent urban communities participation rates are statistically significant as are the higher rates for the rural areas with high urban influence.
- 14 The distribution of hours worked by women is a far more complex issue than is normally acknowledged and the dimensions of the question are probably best explored in depth through the Time Use Survey Callister, P. and S. Dixon (2006). New Zealanders' working time and home work patterns: evidence from the Time Use Survey. Occasional Paper 2001/5.. Wellington Department of Labour, Labour Market Policy Group ; also see Callister, P. (2005). The changing distribution of paid and unpaid work in New Zealand. W. o. L. F. P. a. E. G.-A. Wellington. Wellington Institute of Policy Studies, Victoria University of Wellington: 33, Callister, P. (2005). "Overworked families? Changes in paid working hours of families with young children, 1986 to 2001." *Social Policy Journal of New Zealand* 24: 160-284.
- 15 The odds ratio coefficients are the log of the odds ratio coefficients exponentiated, ie. e^{β} .
- 16 Composition and context are related of course; those seeking fulltime employment would be much more likely to locate in main urban areas so certain compositions are correlated with certain contexts. Correspondingly, those women seeking a life style that does not necessarily include

employment such as the retired may seek locations more consistent with that lifestyle.

- 17 The seminal paper here is Becker Becker, G. S. (1973). "A theory of marriage: part 1." *The Journal of Political Economy* 81(4): 813-846.. It is worth noting our preferred use of the term 'partner' rather than 'marital status', and how this mirrors exactly Becker's own intent in what he nevertheless calls, 'A theory of marriage'. "Marriage," he explains, "simply means that two persons M and F share the same household (p 815) and "differs from the legal definition [to] include persons in "consensual" and casual unions and excludes legally married persons who are separated" Becker, G. S. (1973). "A theory of marriage: part 1." *The Journal of Political Economy* 81(4): 813-846.. The point to make here of course is that the majority of empirical studies which only use marital status in their equations are quite inconsistent with this theoretical position even when they refer to Becker. The result is an unacknowledged degree of measurement error on the partnership variable for increasingly, married women are a declining and quite unrepresentative subset of all partnered women. We have avoided this confusion by not only employing the more current term 'partner' both conceptually but in the way we asked Statistics New Zealand to construct the partnership variable.
- 18 Our analysis is confined to male partners. It would be of interest to extend this to an assessment of the labour impact of female partners although there will be a problem of small numbers.
- 19 This association is now well documented in the international literature Pencavel, J. (1998). "Assortative mating by schooling and the work behaviour of wives and husbands." *The American Economic Review* 88(2): 326-329.. Nevertheless Pencavel makes the point that rarely has the research on the market work decisions of husbands and wives and their marital choices been brought together. See also Liu and Zhang Liu, P.-W. and J. Zhang (1999). "Assortative mating versus the cross-productivity effect." *Applied Economics Letters* 6(8): 523-525.. However also see early work by sociologists on dual career families Rapoport, R. and R. Rapoport (1976). *Dual-career families re-examined*. London, Martin Robinson.
- 20 A related connection is between the marriage market and poverty Cancian, M., S. Danziger, et al. (1993). *Working wives and family income inequality among married couples. Uneven tides, rsing ineuqlaity in America*. S. H. Danziger and P. Gottschalk. New York, Russell Sage Foundation: 195-222.
- 21 The conventional way of specifying the additional attributes of partners would be to add an employed partner term in the equation which has the working partner variable included. However the vast

majority of partners are employed and including both in the same equation forces the rejection of the working partner variable in this case.

- 22 This could be for both labour and non-market reasons; see Pencavel, J. (1998). "Assortative mating by schooling and the work behaviour of wives and husbands." *The American Economic Review* 88(2): 326-329.
- 23 Becker's distinction between the labour of partners being complementary or substituting is relevant here, *op cit*.
- 24 For a sociological take on this issue driven by a concern over the relationship between propinquity and homogamy see the early paper by Ramsay Ramsay, N. R. (1966). "Assortative mating and the structure of cities." *American Sociological Review* 31(6): 773-786.

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