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Is there an impact of labor market freedom on the elderly female labor force participation rate in the U.S.? An exploratory study

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Abstract

This exploratory empirical study investigates the hypothesis that greater labor market freedom should elevate the female labor force participation rate of women age 65 years and older. Strong and consistent empirical support for this hypothesis is provided in this study. For example, a one unit increase in the labor market freedom index appears to induce a 5.3%-6.88% increase in the female labor force participation rate of women age 65 years and older.

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1. Introduction

In the U.S., the gender composition of the labor force has dramatically changed over time. For example, Vedder (1976, pp. 353-354) observed that the female labor force participation rate nearly doubled between the years 1920 and 1965, rising from 22.7% to 39.3%. Vedder (1976, p. 353) further observed that females have for some time been in the process of "…abandoning their traditional household role…" for participation in the workplace. Furthermore, over the period beginning with 1966, the female labor force participation rate rose significantly again, from 40.3% to a high of 60.2% in 2000 (Council of Economic Advisors, 2013, Table B-39).

In recent years, determinants of the female labor force participation rate in the U.S. have been examined by various researchers (Vedder, 1976; Miller and Xiao, 1999; Kalist, 2004; Hotchkiss, 2006; Cebula and Coombs, 2008; Cebula and Alexander, 2015A). The purpose of this *exploratory* empirical study is to extend the existing related literature to provide at least preliminary insight into whether a greater degree of labor market freedom elicits an increase in the female labor force participation rate of *elderly* women, i.e., women age 65 years and older, in the U.S. (hereafter, *ELDFLFPR*). This dimension of female labor force participation, as well as the issue of the impact of labor market freedom thereupon, have heretofore effectively been completely ignored in the scholarly literature. Moreover, as shown in Table I, the issue at hand arguably should be of interest because the percent of the population that is age 65 and over has grown almost without interruption since 1940 and has nearly doubled from 6.835% in 1940 to 13.28% in 2011 (Council of Economic Advisors, 2013, Table B-34). Indeed, nearly one-seventh of the population is "elderly," with the majority thereof being female, so that the focus of this study is on a growing proportion of the U.S. population. Meanwhile, the elderly female labor force participation rate has grown from 8.4% in 1990 to 12.7% in 2011, i.e., by roughly 52%, (U.S. Census Bureau, 2013, Table 1), far exceeding aggregate labor force participation rate growth, which *declined* from 66.5% to 64.1%, i.e., fell by 3.61% over this period (Council of Economic Advisors, 2013, Table B-11). In addition, the focus on this cohort is important due to implications of either increases or decreases in the elderly labor force participation for Medicare enrollment and the magnitude and timing of Social Security contributions and distributions.

Table I. Percent of the Population Age 65 Years and Older

Year	Percent of the Population Age 65 and Older
1940	6.835%
1950	8.141%
1960	9.223%
1970	10.203%
1980	11.289%
1990	12.49%
2000	12.43%
2010	13.07%
2011	13.28%

Source: Council of Economic Advisors (2013, Table B-34).

It is hypothesized that the female labor force participation rate is an increasing function of the degree of labor market freedom, *ceteris paribus*. Indeed, this hypothesis is not formally investigated in any previous published study of the *ELDFLFPR*, although a higher degree of labor market freedom has been found to elevate the *overall* female labor force participation rate (Cebula

and Alexander, 2015A). The analytical framework within which this study is conducted is one wherein the labor force participation rate of elderly women, i.e., those age 65 years of age and older, is an increasing function of the expected net benefits of entering the labor force.

2. A Simple Eclectic Model

This study adopts an eclectic model of determinants of the *ELDFLFPR* based to some extent upon the prior studies by Miller and Xiao (1999), Kalist (2004), Hotchkiss (2006), Cebula and Coombs (2008), and Cebula and Alexander (2015A). The analysis adopts state-level data; accordingly, the variable reflecting the elderly female labor force participation rate is henceforth in this study accompanied by a subscript "*j*" to refer to state *j*, where $j = 1,\ldots,50$.

2.1 Labor Market Freedom

The major difference between the present study and these previous studies, except for Cebula and Alexander (2015A), is the inclusion of a measure of labor market freedom as a potential determinant of the *ELDFLFPRj*. The central hypothesis being addressed in this study is that the greater the overall degree of labor market freedom in state j, the higher the level of ELDFLFPRj, *ceteris paribus*, arguably because greater labor market freedom implies greater benefits that "senior" females can expect to receive from labor force participation. Another difference between the present study and all previous related studies is the introduction of geographic living-cost differentials into the analysis.

There are several well-known measures (indices) of labor market freedom, including those by Bueno, Ashby and McMahon (2012), Gwartney, Lawson, and Hall (2013), and the Heritage Foundation (2013), as well as the more recent endeavor by Stansel, Torra, and McMahon (2016).[1] This study adopts the labor market freedom index, referred to as "Area 3A," by state for the U.S. generated by Bueno, Ashby, and McMahon (2012, Table 3.1). This index consists of three components 3Ai, 3Aii, and 3Aiii. For simplicity and in the interest of space constraints, only brief, simple descriptions of these components are provided here; the reader is referred to Bueno, Ashby, and McMahon (2012, pp. 9-10, 73-75), as well as Stansel, Torra, and McMahon (2016), for a highly detailed description and explanation of these components.

The first component of the labor market freedom index (*3Ai*) involves the state minimum wage at the subnational level. The basic idea in this case is that minimum wage legislation requiring higher wages than market forces would dictate limits the ability of low-skilled and new entrants into the workforce to negotiate for employment they might otherwise be willing to accept and hence restricts the economic freedom of these workers as well as the employers who might otherwise have hired them.

The second component of the labor market freedom index (*3Aii*) involves government employment and takes the perspective that economic freedom decreases for several reasons as government employment increases beyond what is needed for governmental productive and protective functions. Government is regarded as effectively expropriating funds to take an amount of labor out of the labor force, restricting "…the ability of individuals and organizations to contract freely for labor services since employers looking to hire have to bid against their own tax dollars to obtain labor" (Bueno, Ashby and McMahon, 2012, p. 9).

Lastly, the third labor market freedom index component (*3Aiii*) deals with "union density." It is based on the notion that workers should have the right to form and join unions or not to do so,

[1] The latter is an updated (current) version of the data-set derived by Bueno, Ashby, and McMahon (2012).

as they *choose*. It is observed that certain statutes and regulations governing the labor market (a) often force workers to join a union, even if they prefer not to do so (the "union shop"), (b) permit unionization efforts where coercion can potentially be employed, especially where there exist undemocratic provisions such as union certification without a vote by secret ballot, and (c) may make decertification of a union difficult even if a majority of workers would prefer decertification.

Each of these three indices has a value computed that can be as low as 0.0 and as high as 10.0, with a higher index value implying greater labor market freedom (see also the updated version of this dataset by Stansel, Torra, and McMahon, 2016). The present study uses data that measure the overall level of labor market freedom as the equally-weighted average value across these three indices for each state. Hence, in this study:

Area 3Aj = (Area 3Aij + *Area 3Aiij* + *Area 3Aiiij*)/3 (1)

Simply stated, then, the overall labor market freedom index in state j (*AREA 3Aj*, or simply, *LABMKTFREEj*) is a composite index that reflects freedom from government wage and regulations and measures the ability of both workers and firms to interact freely without restrictions imposed by (a) government legislation such as minimum wage laws, (b) unions (for example, the union shop), and (c) government employment beyond what is necessary for the government to meet its basic functions. It is hypothesized here that greater labor market freedom makes it easier for women age 65 and above to enter the workforce and freely and more easily secure employment; alternatively stated, greater labor market freedom may, for women age 65 years and older, elevate the expected net benefits of labor market participation. Thus, ELDFLFPRj is hypothesized to be an increasing function of *LABMKTFREEj*, *ceteris paribus*.

2.2 Control Variables

Following previous studies by Miller and Xiao (1999), Kalist (2004), Hotchkiss (2006), and Cebula and Alexander (2015A), the *ELDFLFPRj* is hypothesized to be an increasing function of expected earnings in state j. The latter is measured in this study by the average annual earnings of employed females in the year 2009, *FEMEARNj*. Hence, the *ELDFLFPRj* is hypothesized to be an increasing function of *FEMEARNj*, *ceteris paribus*.

In the U.S., there exist very substantial interstate variations in the overall cost of living among states. This is illustrated in Table II, which includes the descriptive statistics for all of the variables considered in this study.

Table II. Descriptive Statistics

Variable	Mean	Standard Deviation	Maximum	Minimum
ELDFLFPRj	13.41	2.119	21.10	10.00
LABMKTFREEj	6.53	0.665	7.84	5.21
FEMEARNj	34,285	4,694	45,062	27,855
COLj	100.11	12.44	138.20	80.90
SPOUSEPRESj	48.96	2.72	61.00	43.60
FHSDIPj	85.58	4.06	91.2	77.47
*FUNRATE*j	7.298	1.781	11.2	3.7
FMEANAGE65+j	74.92	0.59	76.3	73.2

As shown in Table II, the overall living-cost index varies from a high of 138.2 to a low of 80.9, with a mean of 100.1 and a standard deviation of 12.44. Given such differentials, it is clear that, other things held the same, living in a state where the overall cost of living is higher implies a lower standard of living. Consequently, it is hypothesized that the higher the cost of living in state

j (*COLj*), the greater the incentive (or need) for women to enter the labor force in search of employment and income, i.e., the higher the expected net benefits of entering the labor force, so that *ELDFLFPRj* is hypothesized to be an increasing function of *COLj*, *ceteris paribus*.

Consider next the percentage of the elderly female population in state j that is married with the spouse present (*SPOUSEPRESj*). As observed in Cebula and Coombs (2008, p. 277), if both the husband and wife are substitutes in the household production of family goods and services (house cleaning, meal preparation, and so forth), one spouse's increased labor supply might well lead to a decrease in the labor supply of the other. Since, on average, men's compensation in the labor market exceeds that of women and since, according to the U.S. Census Bureau (2013, Table 2), elderly men on average have a higher labor force participation rate (20.7%) than elderly women (12.7%), it is expected that the presence of a husband in the home might lead to a lower labor force participation of married elderly women, *ceteris paribus.* Thus, for elderly women, the presence of a husband in the home may reduce the expected net benefits of entering the labor force.

The higher the level of educational achievement for females, the better the prospects of securing employment in the labor market, i.e., the higher the expected net benefits of entering the labor force; hence, it is expected (as in previous studies) that the higher the level of educational achievement among women residing in state j, the higher the *ELDFLFPRj*. The measure of educational achievement in this study is the percentage of females residing in state j who have earned at least a high school diploma (*FHSDIPj*). Clearly, it is being hypothesized in this study that the *ELDFLFPRj* is an increasing function of *FHSDIPj*, *ceteris paribus*.

When deciding upon whether to enter the workforce, the role of the unemployment rate would certainly seem pertinent. In particular, a higher female unemployment rate in state j would imply a reduced probability for women of securing gainful employment in the state if entering the labor force; in other words, a higher female unemployment rate in state j would create a disincentive (lower expected net benefits) for this cohort of women to seek employment in state j. Ergo, it is hypothesized that the higher the female unemployment rate among elderly women in state j (*FUNRATEj*), the lower the *ELDFLFPRj*, *ceteris paribus*.

As a measure of the age characteristics among the female population cohort age 65 years and older, we include the variable FMEANAGE65+j, the average age in state j of the female population age 65 and older. It is observed that the labor force participation rate of the female population age 65 and over drops dramatically (Council of Economic Advisors, 2013, Table B-39). It is hypothesized that among the female population age 65 and older, the older the average age of this cohort in state j, the lower the elderly labor force participation rate in the state will tend to be. This is attributable to both health issues that become increasingly pronounced with age and with increased opportunity costs in terms of higher pension benefits (including Social Security) and arguably a wish to live a fuller, more robust life as people grow older and have a more limited time before their life cycle ends. Such considerations raise the cost of entering the labor force.

3. Empirical Model and Results

Based on the eclectic model expressed above, the following model is to be estimated:

$$ELDFLFPRj = a_0 + a_1\ (LABMKTFREEj) + a_2\,(FEMEARNj) + a_3\,(COLj) + a_4\ (SPOUSEPRESj)\ + a_5\ (FHSDIPj) + a_6\,(FUNRATEj) + a_7\,(FMEANAGE65{+}j) + u \qquad (2)$$

$$\text{Log}\,(ELDFLFPRj) = a_0 + a_1\,(LABMKTFREEj) + a_2\,(FEMEARNj) + a_3\,(COLj) + a_4\ (SPOUSEPRESj + a_5\ (FHSDIPj) + a_6\,(FUNRATEj) + a_7\,(FMEANAGE65{+}j) + u' \qquad (3)$$

where the variables are defined below, with data sources provided in parentheses:
a_0 = constant;
ELDFLFPRj = the percentage labor force participation rate in state j of females age 65 years of age and older in 2011 (U.S. Census Bureau, 2013, Table 2);
Log (*ELDFLFPRj*) = natural log of the percentage labor force participation rate in state j of females age 65 years of age and older in 2011 (U.S. Census Bureau, 2013, Table 2);
LABMKTFREEj = the average overall labor market freedom index in state j in 2010 (Bueno, Ashby, and McMahon, 2012, Table 3.1);
FEMEARNj = the average *annual* earnings of employed elderly females in state j in 2009 (U.S. Census Bureau, 2009A, Table 2);
COLj = the average overall cost of living for a family in state j in 2010 (Council for Community and Economic Research, 2016);
SPOUSEPRESj = the percentage of the elderly female population that was married with spouse present in the home in state j in 2009 (U.S. Census Bureau, 2010A, Table 5);
FHSDIPj = the percentage of elderly females who have earned at least a high school diploma in state j in 2008 (U.S. Census Bureau, 2008, Table 6);
FUNRATEj = the percentage unemployment rate among elderly females in state j in 2009 (U.S. Census Bureau, 2013, Table 2);
FMEANAGE65+j = the average age of the female population age 65 and older in state j in 2010 (U.S. Census Bureau, 2013, Table 2); and
u, u' = stochastic error terms.

Interestingly, Cebula and Alexander (2015B) investigate factors influencing *male* labor force participation in 2010. In that study, whereas labor market freedom is the same basic index as adopted here, it applies for different years, 2011 here versus 2010 in the 2015 study and thus involves different actual data. More importantly, the two studies investigate different dependent variables: *elderly* female force participation behavior in 2011 (*ELDFLFPRj*) in the present study versus labor force participation in 2010 for males age16 and over in the 2015 study. Also, only two of the explanatory variables in the latter study *parallel* those shown above (*male* earnings and *male* unemployment), albeit for different years and genders. The remaining explanatory variables in the present study for 2011 are new and different (*SPOUSEPRESj, FHSDIPj, FMEANAGE65+j*). Furthermore, the 2015 study includes an *explanatory* variable not included in the present study: the percent of the population age 65 and older. Moreover, the cost of living variable in this study differs substantially from the lagged housing price index found in Cebula and Alexander (2015B). Finally, both linear and semi-log OLS as well as 2SLS estimates are presented here as opposed to a single linear OLS estimate in the earlier study. Proceeding, Section 3a below provides estimation results for this model from Ordinary Least Squares (OLS), whereas Section 3b below provides a variation of the model that is to be estimated by two stage least squares (2SLS).

3.1 OLS Estimates

Before proceeding to the estimation results, the issue of a potential *multi-collinearity* problem is considered. In order to assess this issue, Variance Inflation Factors (VIFs) were computed for each of the explanatory variables in this model. These are provided in Table III.

Table III. Variance Inflation Factors

Variable	VIF
LABMKTFREEj	1.23
FEMEARNj	3.01
COLj	3.08
SPOUSEPRESj	1.88
FHSDIPj	2.46
FUNRATEj	2.18
FMEANAGE65+j	1.50

The VIFs obtained are in all cases *not* at all suggestive of multi-collinearity because they are all less than 4.0. Moreover, this is true not only for the control variables but also for the key explanatory variable, the labor market freedom index, whose VIF is only 1.23. Hence, we can safely infer the absence of a multi-collinearity problem in this model (Greene, 2012, Kennedy, 2003; Rogerson, 2001). The empirical model is estimated initially in linear form by OLS, adopting the White (1980) heteroskedasticity correction. These results are provided in Table IV, where all seven coefficients exhibit the hypothesized signs.

Table IV. Initial OLS Estimation Results (Linear Case)

Dependent Variable: *ELDFLFPRj*

Explanatory Variables:	Coefficient	t-value	p-value
LABMKTFREEj	0.767**	3.08	0.0036
FEMEARNj	0.00003	0.55	0.5861
COLj	0.089**	4.76	0.0000
SPOUSEPRESj	-0.209**	-3.80	0.0005
FHSDIPj	0.143*	2.43	0.0196
FUNRATEj	-0.573**	-4.68	0.0000
FMEANAGE65+j	-0.794*	-2.34	0.0242
Constant	60.46		
R^2	0.76		
Adjusted R^2	0.72		
F	18.88**		

**Statistically significant at 1% level; *statistically significant at 5% level.

In addition, four are statistically significant at the 1% level, and two are statistically significant at the 5% level; only the estimated coefficient on the variable *FEMEARNj* fails to be statistically significant at the 10% level. The R^2 and adjusted R^2 values are 0.76 and 0.72, respectively, implying that the model explains approximately three-fourths of the variation in the *ELDFLFPRj* variable for 2011. In addition, the F-statistic is statistically significant at the 1% level, implying that "the regression equation as a whole is significant" (Greene, 2012, p. 268).

The coefficient on the *FHSDIPj* variable is positive, as expected, and statistically significant at the 2% level, implying that the greater the proportion of elderly women who have earned a high school diploma or higher degree, the greater the female labor force participation rate of women age 65 years and older. The estimated coefficient on the *COLj* variable is positive and statistically significant, implying that the higher the cost of living, the greater the female labor force participation rate of women age 65 and older. The estimated coefficient on the *SPOUSEPRESj* variable is negative and statistically significant at the 1% level; this result

constitutes support for our hypothesis that since, on average, men's compensation in the labor market exceeds that of women, the presence of a husband in the home might lead to a decrease in the female labor force participation rate of women age 65 years and older. The coefficient on the female unemployment rate *FUNRATEj* is negative and statistically significant at the 1% level, implying that the higher the unemployment rate of elderly women, the lower the incentive for women aged 65 years and older to join the labor force. The coefficient on the *FMEANAGE65+j* variable is negative, as hypothesized, and statistically significant at the 2.5% level, implying that the older a woman is, the lower her labor force participation rate. Finally, and most relevant, given the objective of this empirical study, the estimated coefficient on the labor market freedom index, *LABMKTFREE*, is positive and statistically significant at the 1% level. This result implies that, the greater the female labor force participation rate of women age 65 years of age and older.

The semi-log OLS estimate of the model is found in Table V.

Table V. Semi-log OLS Estimation Results

Dependent Variable: log (*ELDFLFPRj*)

Explanatory Variables:	Coefficient	t-value	p-value
LABMKTFREEj	0.053**	3.01	0.0044
FEMEARNj	0.000003	1.05	0.2997
COLj	0.0059**	5.08	0.0000
SPOUSEPRESj	-0.013**	-3.63	0.0008
FHSDIPj	0.0086*	2.01	0.0504
FUNRATEj	-0.044**	-4.58	0.0000
FMEANAGE65+j	-0.045*	2.16	0.0367
Constant	5.19		
R^2	0.75		
Adjusted R^2	0.71		
F	18.35**		

**Statistically significant at 1% level; *statistically significant at 5% level.

Not surprisingly, these results parallel those found in Table IV. For example, four of the estimated coefficients are statistically significant at the 1% level and two are statistically significant at the 5% level. Once again, the F-statistic is significant at the 1% level, implying the estimate as a whole is significant (Greene, 2012, p. 268).

Of these estimation results, the most relevant from the perspective of this study is that the female labor force participation rate is again found to be an increasing function of the labor market freedom index. Indeed, in this estimate, it is revealed that a one unit increase in the labor market freedom index induces a 5.32% increase in the female labor force participation rate of women age 65 and older. Once again it is observed that *ELDFLFPRj* (the labor force participation rate in state j of females age 65 years of age and older in 2011) was an increasing function of *FHSDIPj* and *COLj* and a decreasing function of *SPOUSEPRESj, FUNRATEj*, and *FMEANAGE65+j*.

3.2 2SLS Estimations

In this section of the study, we test whether 2SLS estimates of a modestly modified version of the model yield similar findings to the OLS results shown in Tables IV and V. In particular, it can be argued that the residents of a state may become quickly aware of an increased (or decreased) cost of living, whereas their awareness of increased labor market freedom and changes in the values of the other explanatory variables in the model may lag behind their living-cost conditions awareness.

If this is a reasonable possibility, the overall average level of the cost of living index (*COLj*) would correspond to the year 2011 rather than to the year 2010. In turn, since the dependent variable, *ELDFLFPRj*, would be contemporaneous with the new living-cost variable, COL2011j, then simultaneity bias could well arise. This suggests the adoption of 2SLS rather than OLS and the identification of suitable instrumental variable(s). In this case, the instruments are the average cost of living index for the year 2008 (Council for Community and Economic Research, 2016) and the housing price index for 2007 (U.S. Census Bureau, 2010B, Table 713). These instruments were chosen because they were both highly correlated with the 2011 cost of living index while being uncorrelated with the error term in the system. The modified equations (4) and (5) below replace equations (2) and (3), respectively:

$$ELDFLFPRj = a_0 + a_1\,(LABMKTFREEj) + a_2\,(FEMEARNj) + a_3\,(COL2011j) + a_4\,(SPOUSEPRESj) + a_5\,(FHSDIPj) + a_6\,(FUNRATEj) + a_7\,(FMEANAGE65{+}j) + u'' \quad (4)$$

$$\text{Log}\,(ELDFLFPRj) = a_0 + a_1\,(LABMKTFREEj) + a_2\,(\text{FEMEARNj}) + a_3\,(COL2011j) + a_4\,(SPOUSEPRESj) + a_5\,(FHSDIPj) + a_6\,(FUNRATEj) + a_7\,(FMEANAGE65{+}j) + u''' \quad (5)$$

where u" and u"' are stochastic error terms and variable *COL2011j* replaces variable *COLj*.

As shown in the 2SLS estimate summarized in Table VI below, all seven of the estimated coefficients exhibit the hypothesized signs, with three being statistically significant at the 1% level and three being statistically significant at the 5% level. The F-statistic is statistically significant at the 1% level, implying that this equation as a whole is significant (Greene, 2012, p. 268). Furthermore, the J-statistic is statistically significant at the 1% level, attesting to the exogeneity of the instrumental variables.

Table VI. Linear 2SLS Estimation Results
Dependent Variable: *ELDFLFPRj*

Explanatory Variables:	Coefficient	t-value	p-value
LABMKTFREEj	0.969**	3.21	0.0026
FEMEARNj	0.00002	0.37	0.7114
COLj	0.072**	3.38	0.0016
SPOUSEPRESj	-0.128*	-2.07	0.0005
FHSDIPj	0.139*	2.55	0.0144
FUNRATEj	-0.534**	-4.45	0.0001
FMEANAGE65+j	-0.999*	-2.38	0.0219
Constant	72.06		
F-statistic	14.49**		
J-statistic	15.76**		

**Statistically significant at 1% level; *statistically significant at 5% level.

As for the specific 2SLS estimation results, qualitatively speaking, they extensively parallel the OLS results in Tables III and IV. For example, the estimated coefficient on the *FHSDIPj* variable is positive and statistically significant at beyond the 2% level, implying that the greater the proportion of elderly women who have earned a high school diploma or higher degree, the greater the female labor force participation rate of women age 65 and older. The coefficient on the *COLj* variable is positive and statistically significant at the 1% level, implying that the higher the cost of living, the greater the female labor force participation rate of women age 65 and older. The

coefficient on the variable SPOUSEPRESj is negative and statistically significant at the 5% level, lending support for our hypothesis that since, on average, men's compensation in the labor market exceeds that of women, the presence of a husband in the home might lead to a decrease in the female labor force participation rate of women age 65 and older. The coefficient on the female unemployment rate *FUNRATEj* variable is negative and statistically significant at the 1% level, implying that the higher the unemployment rate, the lower the female labor force participation rate of women aged 65 years and older. The negative and statistically significant (2.5% level) coefficient on the *FMEANAGE65+j* variable implies that the older a woman age 65 and over is, the lower her labor force participation rate. Finally, the most relevant estimated coefficient, i.e., that for the labor market freedom variable, is positive and statistically significant at the 1% level. This estimation result implies that the higher the labor market freedom index, the greater the female labor force participation rate of women age 65 years of age and older, as hypothesized.

The 2SLS semi-log estimation results shown in Table VII also effectively parallel those in Tables III and IV (as well as those in Table VI). All of the estimated coefficients have the expected signs. Of these, three are statistically significant at the 1% level, two are significant at the 5% level, and one is significant at the 7% level. As for the labor freedom variable, its coefficient is positive and significant at the 1% level. As shown, a one unit increase in the labor freedom index, say from 6.0 to 7.0, would raise the elderly female labor force participation rate by 6.88%.

Table VII. Semi-log 2SLS Estimation Results
Dependent Variable: log (*ELDFLFPRj*)

Explanatory Variables:	Coefficient	t-value	p-value
LABMKTFREEj	0.0688**	3.18	0.0028
FEMEARNj	0.000002	0.53	0.5974
COLj	0.005**	3.35	0.0017
SPOUSEPRESj	-0.0083#	-1.89	0.0653
FHSDIPj	0.0085*	2.31	0.0261
FUNRATEj	-0.041**	-4.48	0.0001
FMEANAGE65+j	-0.059*	-2.40	0.0209
Constant	5.96		
F-statistic	14.90**		
J-statistic	11.77**		

**Statistically significant at 1% level; *statistically significant at 5% level; #statistically significant at 10% level.

4. Conclusion

This exploratory empirical study investigates the hypothesis that greater labor market freedom (*LABMKTFREE*) should elevate the female labor force participation rate of women age 65 years and older (*ELDFLFPR*). Strong and consistent empirical support for this hypothesis is provided in this study. For example, a one unit increase in the *LABMKTFREE* index appears to induce a 5.3%-6.88% increase in the female labor force participation rate of women age 65 years and older. While this finding is only preliminary, it is perhaps noteworthy that numerous other specifications of the basic model involving a variety of other variables also yield support for the hypothesis in question. Future related research might, among other things, consider additional and/or alternative explanatory variables and/or different empirical techniques to investigate the impact of labor

market freedom on the *ELDFLFPR* variable, including panel data analysis of this issue, if suitable data can be found. Research at the metropolitan area level would also seem very useful once the necessary data become available. Stansel (2013) provides data for 2002 and would seem to provide a foundation to develop more current metropolitan labor freedom data.

The results in this study imply that (a) policies that do not artificially elevate minimum wages above what the market would establish and/or (b) government employment policies that do not exceed levels required to provide productive and protective functions and/or (c) government policies that increase the ability of workers to choose to *not* be union members act to elevate the elderly female labor force participation rate.

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