

The Long-term Effects of Maternal Employment on Daughters' Later Labour Force Participation and Earnings

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Estimated Effects of Maternal Employment (ME)

Cognitive Outcomes

- Blau and Grossberg (1992) , Baum (2003), Ruhm (2004), Gregg et al. (2005), Bernal (2008), Gagne (2002), Berger et al. (2005), James-Burdumy (2005) , Gennetian et al. (2002), Waldfogel et al. (2002) and Ruhm (2008)

Behavioural Outcomes

- Baker et al. (2008) , Aughinbaugh and Gittleman (2004) , Lopoo (2004)

Health Outcomes

- Anderson et al. (2003)

Literature focuses on the effects of **current** maternal employment on **current** child outcomes

Evidence of Long Term Effects

- Ermisch and Francesconi (2002)
- Dustman and Schoenberg (2008)
- Wurtz (2009)

Our paper:

We examine the long run effects of ME when the daughter is between 1-17 years of age on two measures of the daughter's later labour force activity at ages 20-40:

- Probability of working
- Earnings

What makes our paper unique:

1. Long run effects of ME
2. ME measured at between 1-17 years (not just young ages)
3. Outcomes measured between 20-40 years
4. Unique administrative data (huge!)

Theoretical Framework

- **Household Production Model, Becker and Tomes (1986)**
 - ME will decrease the time available for producing child outcomes, but will increase the amount of market goods that can be purchased.
- **Socialization or Role Model Theory, (see discussion in Haveman and Wolfe (1995))**
 - ME changes the preferences of the child by creating specific values about working and attachment to the labour force.

Empirical Strategy

$$\begin{aligned} \text{Working}_{it} = & \alpha + \beta \text{ME}(1-17)_i + \text{Time Invariant Family Charac} \delta_i \\ & + \text{Daughter's Current Situation Charac}_{it} \phi + \varepsilon_{it} \end{aligned}$$

Identification Concern

Non-Random Selection into Employment (Unobserved Heterogeneity)

- Mothers who choose to work may be different in unobserved ways, such as skill, ability or preferences, from mothers who choose not to work.
- Direction of Bias is ambiguous

I. Sister Fixed Effects

- Controls for any unobserved factors that are constant across sisters over time, including mothers' fixed characteristics, such as education

II. Instrumental Variables

- Using the average unemployment rate for the Economic Region for each year we have information on the mothers' employment status as our instrument

III. “Gottshalk (1996)”

- Exploit the order in which events occur to identify the effects of unobserved heterogeneity
- Achieves identification through assumptions about timing rather than the usual exclusionary restrictions required for IV
- Include a measure of future ME in our models in addition to past ME.
 - As future ME cannot be causal, we interpret a significant coefficient as evidence of unobserved heterogeneity.

Findings:

- Linear Probability Models (LPM) suggest a strong positive relationship between ME and daughters' later labour force participation and earnings
 - Strongest relationship when the daughters are in their late teens (15-17 years)
- No long term effects remain (in most cases) when unobserved heterogeneity is addressed.

Longitudinal Administrative Database (LAD)

- 20 % random sample of Canadian tax filers (N=6 million in 2000)
- 1982 - 2005
- Longitudinal
- Individuals are matched into family units on an annual basis and the related family information is added to each individual's record
- Sources of income, taxes and demographic information at both individual and family levels.

LAD Years

3	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42

Sample Selection

- Daughters, 20-40 yrs. between 1985-2005
who
- Filed a tax return while living at home with their parents between the ages of 15-19 (70%)
and whose
- Mother (stepmother) also appears in the LAD (19.74%)
and whose
- Mothers filed taxes for at least one year when the her daughter was between 1 and 17 (99%)

Final Sample

- 94,500 daughters
- 935,300 observations when multiple observations per daughter are included

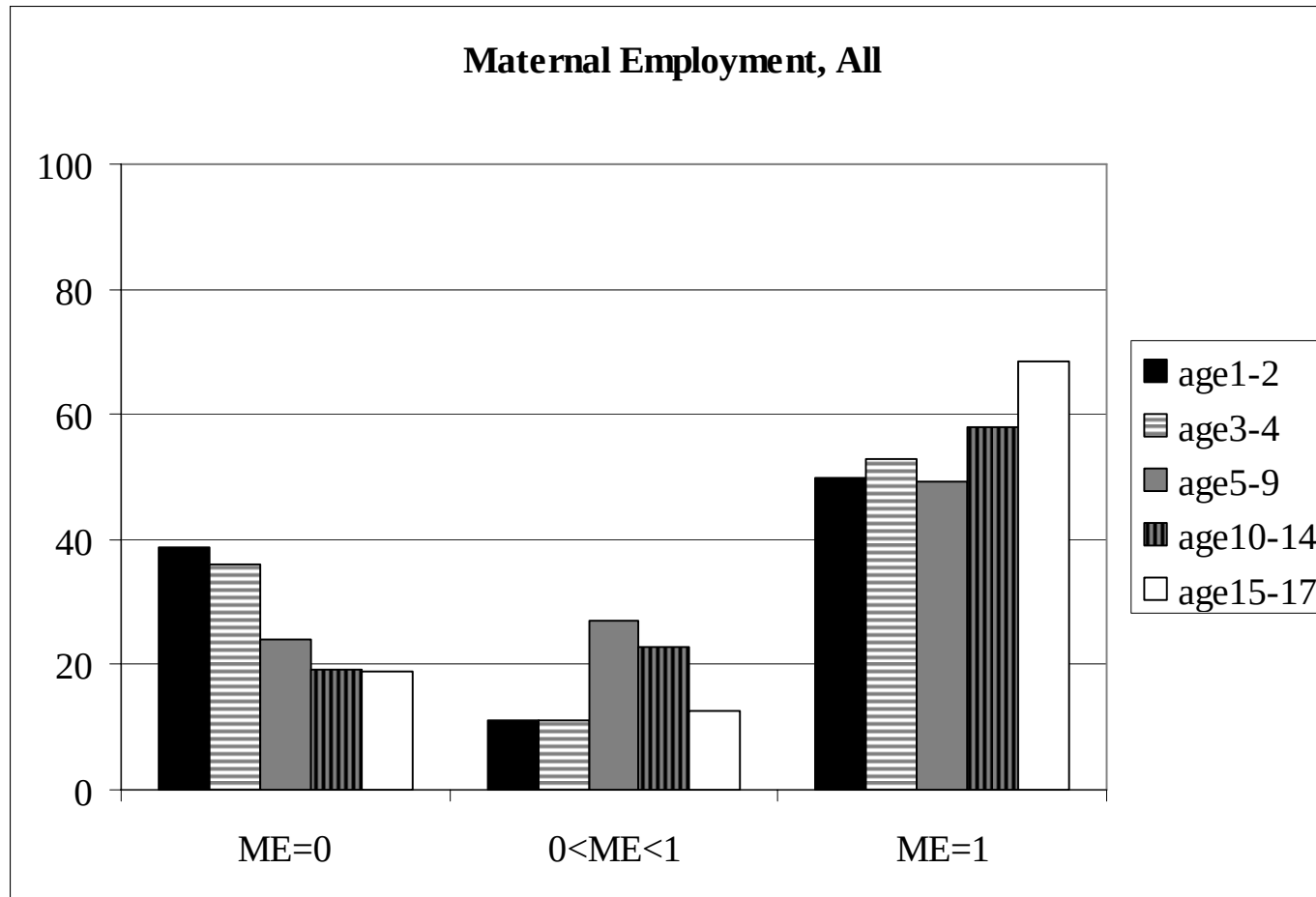
Maternal Employment Variable

- For each year, we construct a 0/1 indicator for the presence of maternal employment income in excess of \$1000.
- ME = number of years 'mom worked' as a proportion of observed years between ages 1-17
 - ME $\in [0,1]$

Other Independent Variables

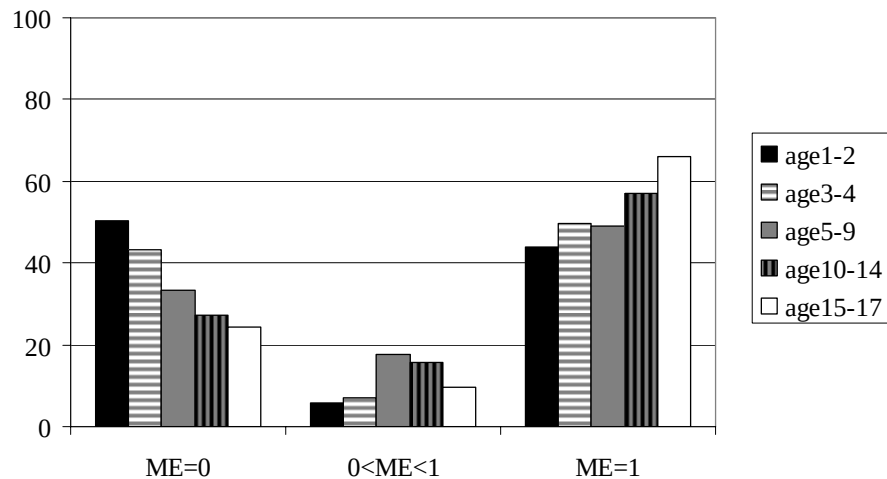
- Daughter's situation growing up
 - Average family market income (ages 1-17)
 - % years daughter is observed to be in a lone parent family (ages 1-17)
- Daughter's current situation
 - Family status
 - Region size
 - Province
 - Currently residing with parents
 - English speaker in QC/French speaker outside of QC
 - Age
 - Calendar Year
 - Age at match
 - Missing data regarding ME
 - Age of Mother at birth of daughter

Distribution of ME by age

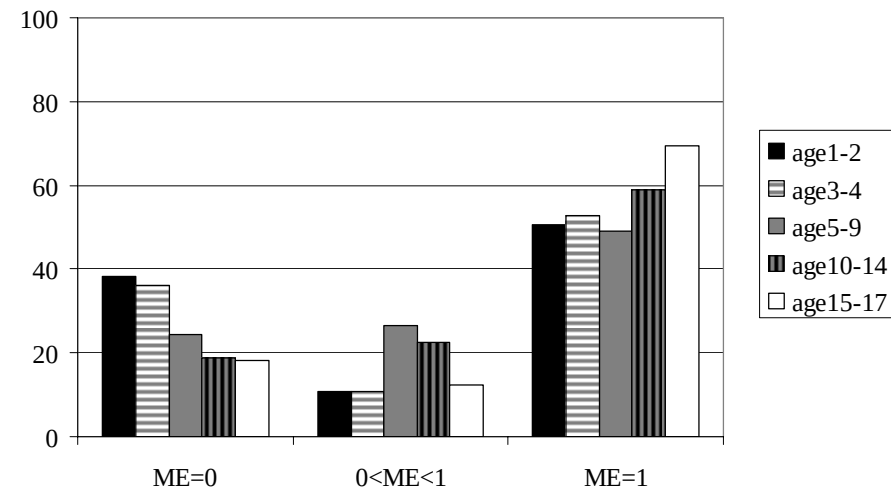


Distribution of ME, Family Type

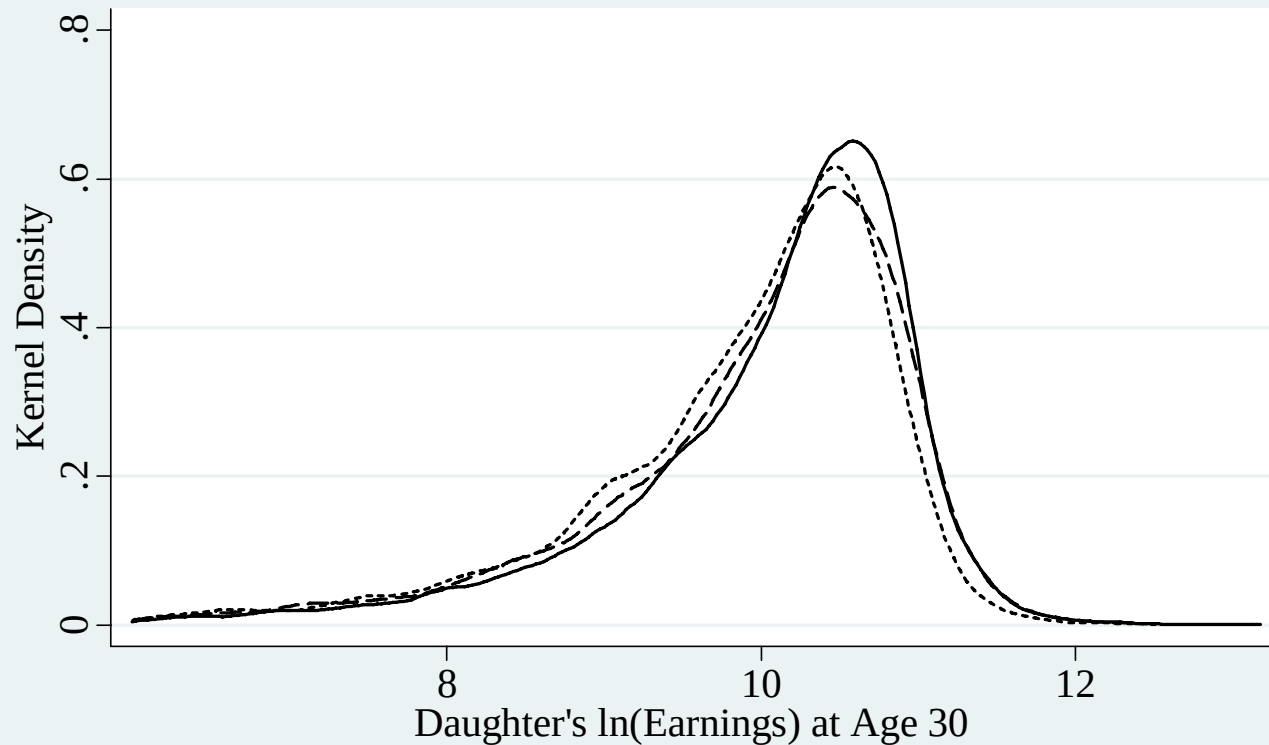
Maternal Employment,
Always Lone-Parent Family



Maternal Employment,
Always Two Parents Family



Kernel Density $\ln(\text{earnings})$



..... Mother never worked - - - - - Mother sometimes worked
——— Mother always worked

Main Results

Dependent Variable: Working

	LPM	FE	IV	Gottshalk
Maternal Employment Ages 1-17	0.054*** [0.002]	0.002 [0.012]	0.049 [0.136]	0.040*** [0.002]
Family Market Income Ages 1-17	0.001*** [0.000]	-0.002*** [0.001]	0.001*** [0.000]	0.001*** [0.000]
Always Lone Mother Family Ages 1-17	-0.046*** [0.004]	-0.023 [0.023]	-0.046*** [0.007]	-0.044*** [0.004]
Maternal Employment 'After'				0.045*** [0.002]
1 st Stage t-stat for instrument			-3.67	
Hausman Test			0.8543	
N	935300	935300	935300	847155

Variation in Maternal Employment across Sisters

	N	With Sisters	ME Same	ME Different
Age 1-2	27,975	2,355	1,425	930
Age 3-4	36,260	3,255	2,005	1,250
Age 5-9	57,885	5,535	3,520	2,015
Age 10-14	81,060	7,810	5,555	2,255
Age 15-17	92,240	8,720	6,770	1,955

Main Results

Dependent Variable: $\ln(\text{earnings})$

	LPM	FE	IV	Gottshalk
Maternal Employment Ages 1-17	0.058*** [0.007]	-0.073* [0.043]	2.421** [1.002]	0.045*** [0.007]
Family Market Income Ages 1-17	0.002*** [0.001]	-0.008*** [0.003]	0.003*** [0.001]	0.002*** [0.001]
Always Lone Mother Family Ages 1-17	-0.124*** [0.011]	-0.177** [0.086]	-0.265*** [0.063]	-0.121*** [0.011]
Maternal Employment 'After'				0.038*** [0.006]
1st Stage t-stat for instrument			-2.85	
Hausman Test			0.0000	
N	827205	827205	827205	748795

**Regressions are CONDITIONAL on working.

Breaking down ME into age groups

Dependent Variable: Working

	LPM	FE	IV	Gottshalk
ME Ages 1-2	0.020*** [0.004]	0.007 [0.010]	-0.226 [0.534]	0.019*** [0.004]
ME Ages 3-4	0.001 [0.003]	0.002 [0.008]	0.123 [0.480]	-0.001 [0.004]
ME Ages 5-9	0.010*** [0.003]	0.023*** [0.007]	-0.165 [0.153]	0.007** [0.003]
ME Ages 10-14	0.018*** [0.003]	0.015** [0.006]	0.12 [0.162]	0.015*** [0.003]
ME Ages 15-17	0.041*** [0.003]	0.012* [0.006]	0.042 [0.141]	0.031*** [0.003]
Maternal Employment 'After'				0.041***
N	935300	935300	935300	847155

Breaking down ME into age groups

Dependent Variable: ln(earnings)

	LPM	FE	IV	Gottshalk
ME Ages 1-2	0.001	-0.057	-0.604	-0.001
	[0.011]	[0.036]	[2.662]	[0.012]
ME Ages 3-4	-0.015	-0.007	0.594	-0.021**
	[0.010]	[0.029]	[2.364]	[0.010]
ME Ages 5-9	-0.006	-0.055**	0.173	-0.008
	[0.009]	[0.024]	[0.533]	[0.009]
ME Ages 10-14	0.026***	-0.070***	0.502	0.021**
	[0.009]	[0.021]	[0.626]	[0.009]
ME Ages 15-17	0.042***	0.009	0.776	0.033***
	[0.008]	[0.023]	[0.650]	[0.009]
Maternal Employment 'After'				0.035***
				[0.006]
N	827205	827205	827205	748795

Dependent Variable: Working

	LPM	FE	IV	Gottshalk
Always 2 Parent Family				
ME Ages 1-17	0.045*** [0.002]	0.018 [0.013]	0.076 [0.055]	0.033*** [0.002]
Family Market Income Ages 1-17	0.001*** [0.000]	-0.003*** [0.001]	0.001*** [0.000]	0.001*** [0.000]
Maternal Employment 'After'				0.038*** [0.002]
1 st Stage t-stat for instrument			-8.55	
Hausman Test			0.0350	
N	776195	776195	776195	705535
Always Lone Parent Family				
ME Ages 1-17	0.098*** [0.012]	0.088 [0.176]	0.042 [0.116]	0.074*** [0.012]
Family Market Income Ages 1-17	-0.002 [0.003]	-0.026*** [0.009]	-0.002 [0.003]	-0.002 [0.003]
Maternal Employment 'After'				0.068*** [0.011]
1 st Stage t-stat for instrument			-4.44	
Hausman Test			0.1819	
N	47400	47400	47400	44205
Sometimes Lone Parent Family				
ME Ages 1-17	0.117*** [0.008]	0.098* [0.055]	0.091 [0.088]	0.089*** [0.008]
Family Market Income Ages 1-17	0.003*** [0.001]	0.003 [0.002]	0.003*** [0.001]	0.003*** [0.001]
Maternal Employment 'After'				0.076*** [0.007]
1 st Stage t-stat for instrument			6.22	
Hausman Test			0.5520	
N	111705	111705	111705	97420

Dependent Variable: ln(earnings)

	LPM	FE	IV	Gottshalk
Always 2 Parent Family				
ME Ages 1-17	0.056*** [0.007]	-0.036 [0.047]	0.755*** [0.218]	0.044*** [0.008]
Family Market Income Ages 1-17	0.002*** [0.001]	-0.011*** [0.003]	0.003*** [0.001]	0.002*** [0.001]
Maternal Employment 'After'				0.037*** [0.007]
1st Stage t-stat for instrument			-7.82	
Hausman Test			0.0000	
N	692180	692180	692180	628800
Always Lone Parent Family				
ME Ages 1-17	0.070** [0.033]	-0.727 [0.614]	0.794** [0.383]	0.043 [0.036]
Family Market Income Ages 1-17	0.009 [0.012]	-0.003 [0.057]	0.007 [0.012]	0.009 [0.012]
Maternal Employment 'After'				0.066** [0.030]
1st Stage t-stat for instrument			-4.47	
Hausman Test			0.0000	
N	39520	39520	39520	36860
Sometimes Lone Parent Family				
ME Ages 1-17	0.086*** [0.020]	0.228 [0.177]	-0.530* [0.294]	0.073*** [0.022]
Family Market Income Ages 1-17	0.005** [0.002]	0.002 [0.006]	0.010*** [0.003]	0.005** [0.002]
Maternal Employment 'After'				0.039** [0.018]
1st Stage t-stat for instrument			5.98	
Hausman Test			0.0000	
N	95505	95505	95505	83140

Conclusions

- LPM overestimates the true relationship between ME and daughters' later labour force participation and earnings*
- Results call into question the growing concern previous research has raised regarding the negative effects of ME on child outcomes