Prenatal Sex Selection and Missing Girls in China:

Evidence from the Diffusion of Diagnostic Ultrasound

G2 at GW 2010

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Missing Women

- The problem: identified by Sen (1990)
  - Sex ratio (male to female) exceeds the biological norm in South and East Asia
  - Ethical implications: gender inequality
  - Adverse social consequences: marriage market; crime; etc.
- Missing Women in China
  - Historically high sex ratio
    - Tens of millions of Chinese women were "missing": Coale (1991); Sen (1990, 1992)
  - Worsening of the problem in recent years
    - Rising sex ratio at birth since the early 1980s

Sex Ratio at Birth in China
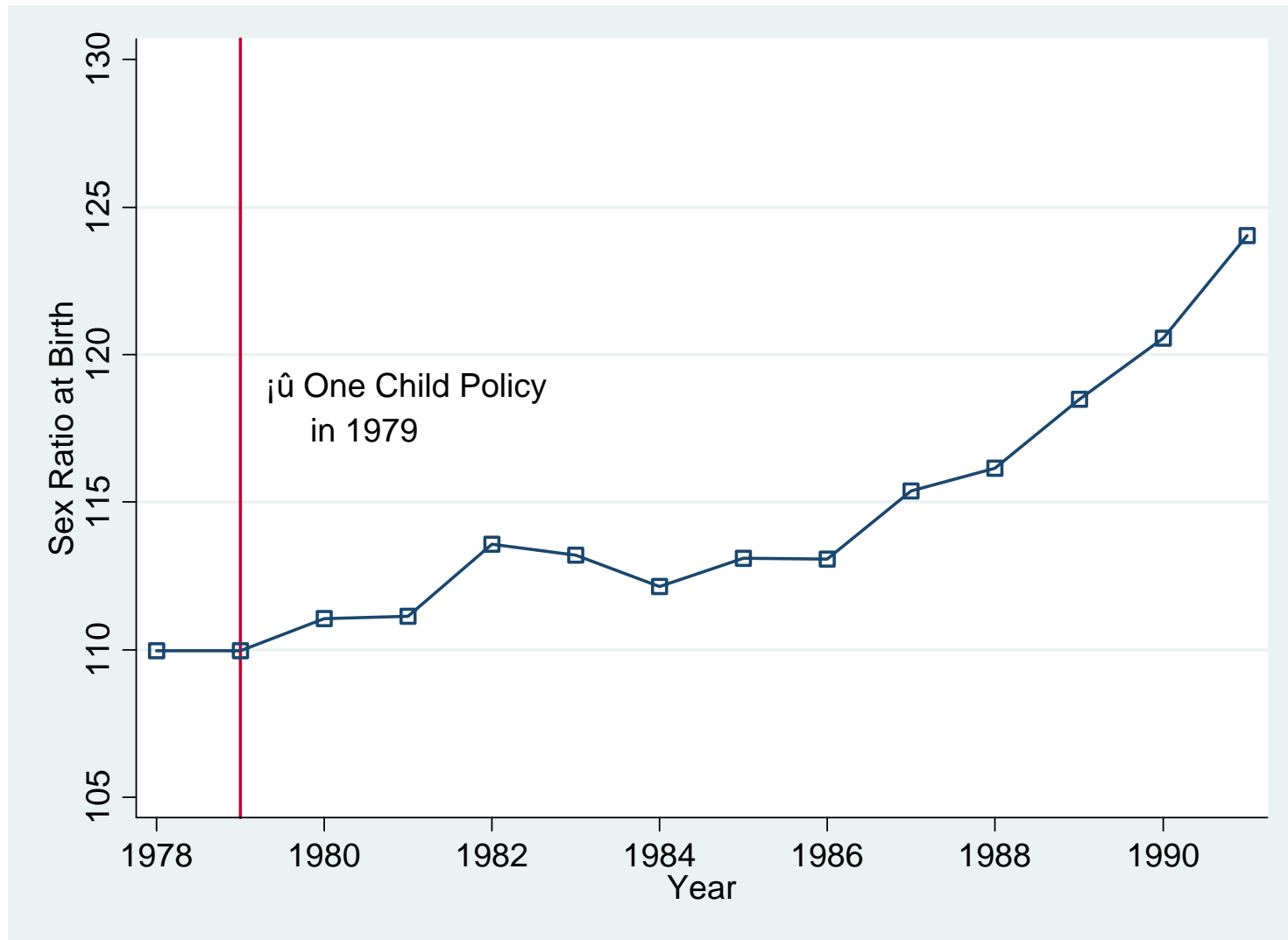
Source: China Children Survey 1992.
Notes: Sex ratio at birth is defined as the number of male births per 100 female births.
Vertical line indicates year of introduction of China's One Child Policy (1979).

Research Question

- How much of the increase in the sex ratio (males to females) at birth since the early 1980s in China is due to increased <u>prenatal sex selection</u>?
  - Empirical Challenges
    - Data on sex ratio *at birth*
    - How to obtain variation in the access to prenatal sex selection that is orthogonal to demand factors
- We collect new data that tracks the differential diffusion of diagnostic ultrasound in China and use data that record gender of births
- We answer this question by exploiting the differential introduction of ultrasound throughout China during the 1980s, which significantly reduced the cost of prenatal sex selection.

Prior Work on "Missing Girls" in China

- Competing explanations
  - Discrimination: sex selection
    - Postnatal: mistreatment and neglect of girls (female infanticide)
    - Prenatal: sex-selective abortion
  - Biology: Hepatitis B
    - Oster (2005) vs. Lin and Luoh (2008)
- What is already known on this topic?
  - Hepatitis B Does Not Explain Male-Biased Sex Ratios in China (Oster, 2008)
  - Discrimination, not biology, remains to blame (by implication)
- Evidence of sex selection in China
  - Zeng et al (1993); Chu (2001); Ebenstein (forthcoming)
  - Increasing sex ratio at birth with higher birth order parities
  - Suggestive, but indirect and inconclusive

Motivation behind Sex Selection in China

- Son preference
  - "Cultural" reasons: to continue the family line, etc
  - Economic considerations:

    Girls marry "out" of their natal families

    Old-age support from sons
- Fertility control policy
  - One Child Policy (since 1979): put a legal limit on the family size
  - More costly to have multiple births to ensure the birth of son(s)
  - Effectively raised the opportunity cost of having another kid of the "unwanted" sex
  - Lower fertility, higher sex ratios

Sex Selection in China

- Postnatal selection
  - Female infanticide
  - Neglect of baby girls
- Prenatal selection
  - Chiefly sex-selective abortion, which needs
  1. Technology that reveals fetal sex
  2. Induced abortion
     - Legal in China and provided in government health facilities
     - Subsidized by government and rewarded by paid leave

The Technology of Diagnostic Ultrasound

- The most inexpensive and easily accessible method for fetal sex determination
- Originally designed for diagnostic purposes
- Capable of prenatal sex determination
    - 16th week onwards in pregnancy
    - Accuracy greatly improved by the 20th week
    - Non-invasive: safe and painless
    - Quick results
    - What matters most: it is cheap!
- Entered different Chinese counties in different years

Diffusion of Ultrasound in China

- In 1979: China produced its first ultrasound B machine
- Since the early 1980s: the diffusion started
- By 1987: over 13,000 machines, or 6 per county
- In the early 1990s: can produce over 10,000 machines annually, or 4 additional machines per county
- By the mid-1990s, all county hospitals and clinics have been equipped with ultrasound machines
- Prenatal sex determination banned in 1989, however hard to police

Data: Diffusion of Ultrasound

- The dataset identifies the years in which ultrasound machines were introduced into 1,572 counties in China

- Collected from thousands of volumes of Local Gazetteers of China

- Local Gazetteers:
  - "encyclopedia" of a particular region
  - compiled by local governments
  - introduction time of ultrasound machines often recorded as achievement in the public health sector

An Example

Tianzhen County Gazetteer
《天镇县志》

Chapter 16: Public Health and Sports

Section 1: Public Health

Page 797

Translation:

In 1989, the county hospital purchased one B-ultrasound scanner.

1989 年置 B 型超声波机 1 台。

南街周家牌楼。有医务人员 14 人，设内、外、中医等科。1950 年改称县卫生所，医务人员 5 人，年门诊 6416 人次，手术 197 例。1952 年改名卫生院联合门诊部，床位 10 张。1954 年改为县人民医院，址在东街路北，设内、外、妇产、中医、放射、检验科。1965 年迁址东北街现址，建筑面积 1332 平方米，医务人员 57 名，床位 53 张，年门诊 2.8 万余人。"文化大革命"中，有一定临床经验的技术骨干被批斗、下放，医护不分。70 年代逐步调整技术力量，医疗工作得到发展。1984 年医院建筑面积达

县人民医院住院大楼

4142 平方米；全院 120 人，内有医务技术人员 96 人，分设门诊、住院部；床位 130 张，其中内科 51 张，外科 27 张，儿科 14 张，妇科 11 张，传染科 18 张，五官科 3 张。1985 年统计，有 300 元以上医疗器械 94 件，其中较大型的有 300mA 和 200mAX 光机、超声心动图、脑血流图、心脑急救装置、心电图机、病人监护仪、裂隙灯显微镜、万能手术床、万能产床、子宫内窥镜、电测听器、心脏除颤起博器、微波针灸仪、牙科综合治疗台、电动自动洗胃机、救护车等。1989 年置 B 型超声波机 1 台。1990 年全院人员有 151 名，其中副主任医师 1 人，主治（主管）医（药、护、技）师 38 人，医（药、护、技）师 42 人，初级以下人员 35 人，行政管理 8 人，工勤 27 人。设有内、外、儿、妇、五官、中医、放射、医技、药剂、手术、理疗、心电图、超声波、化验、急诊、注射等科室。有床位 130 张，年门诊 2.4 万余人次。住院病患者 3019 人次，出院患者 3010 人次。
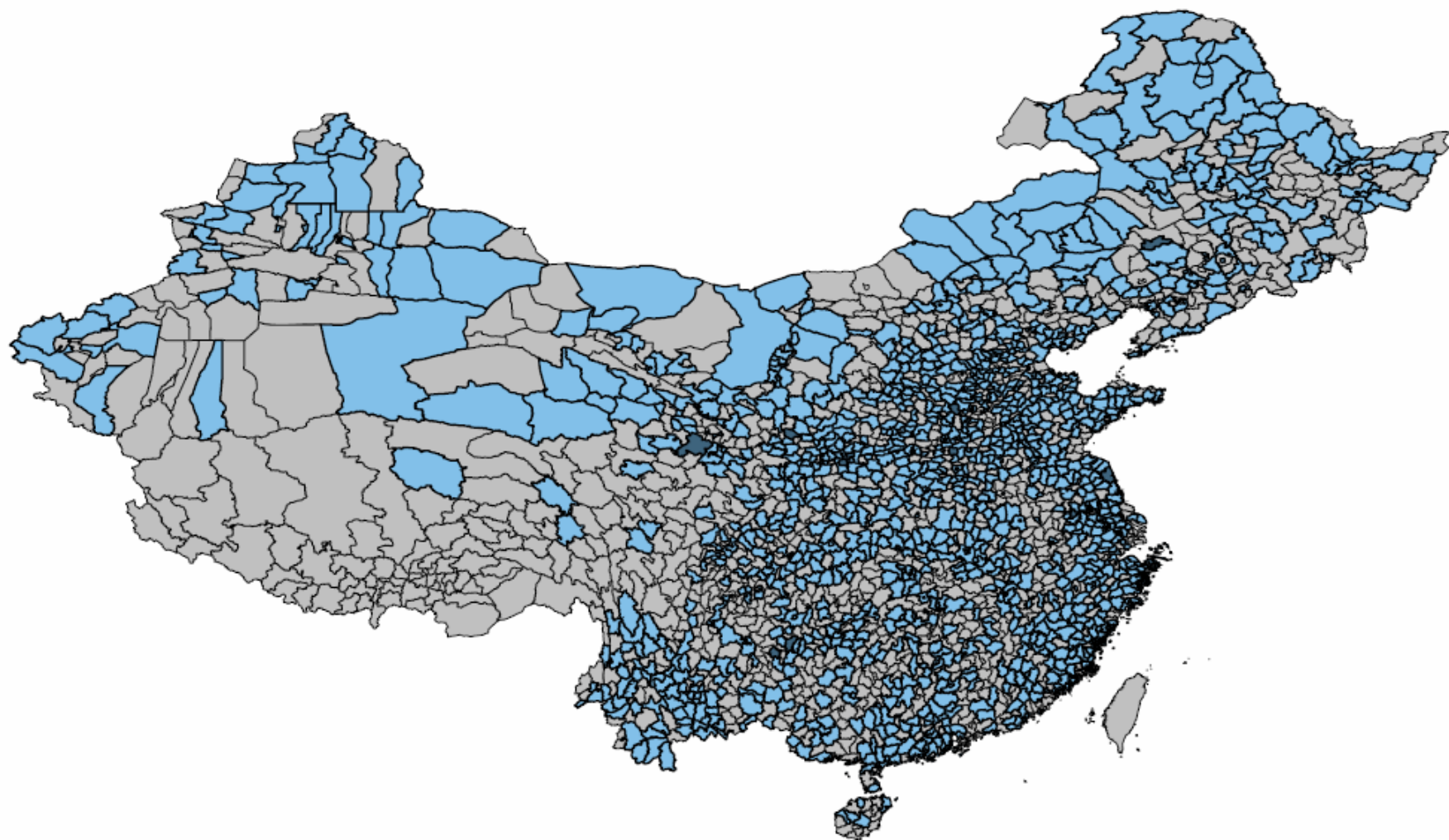
县中医院　1984 年 5 月设，借址县城西街，有医务人员 8 名，
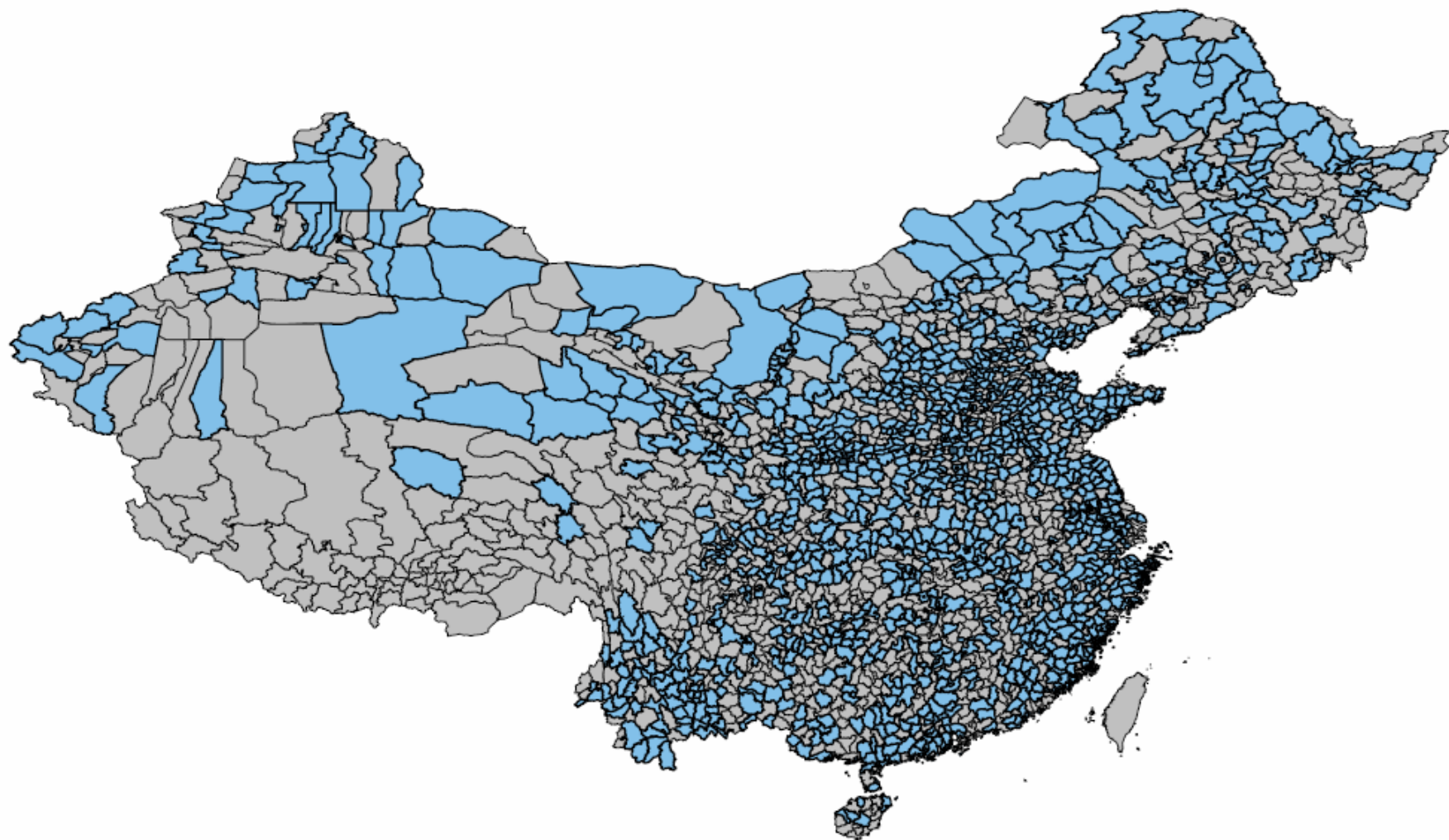
Ultrasound availability in 1976
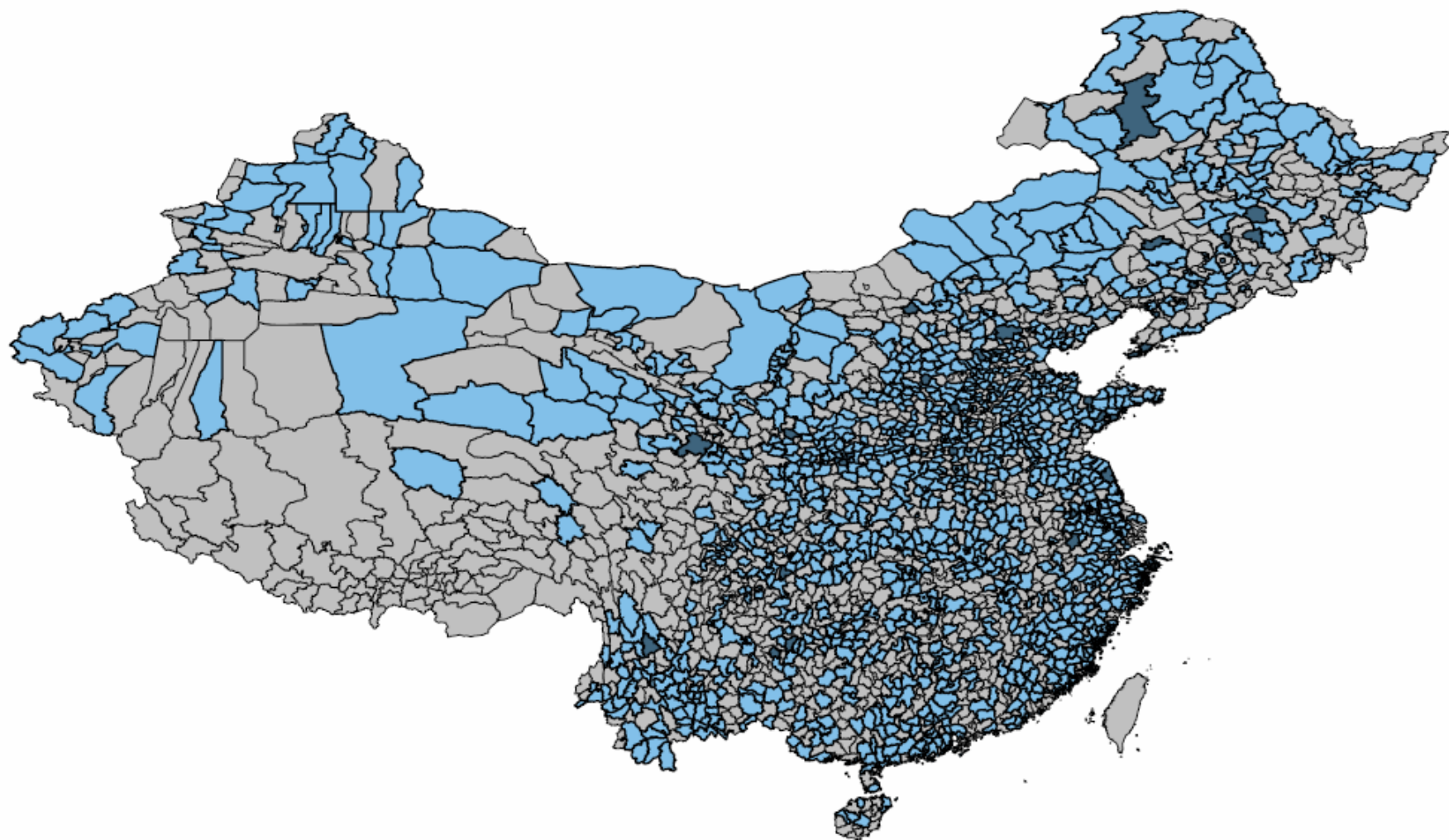dark blue = ultrasound. light blue = no ultrasound. grey = no data
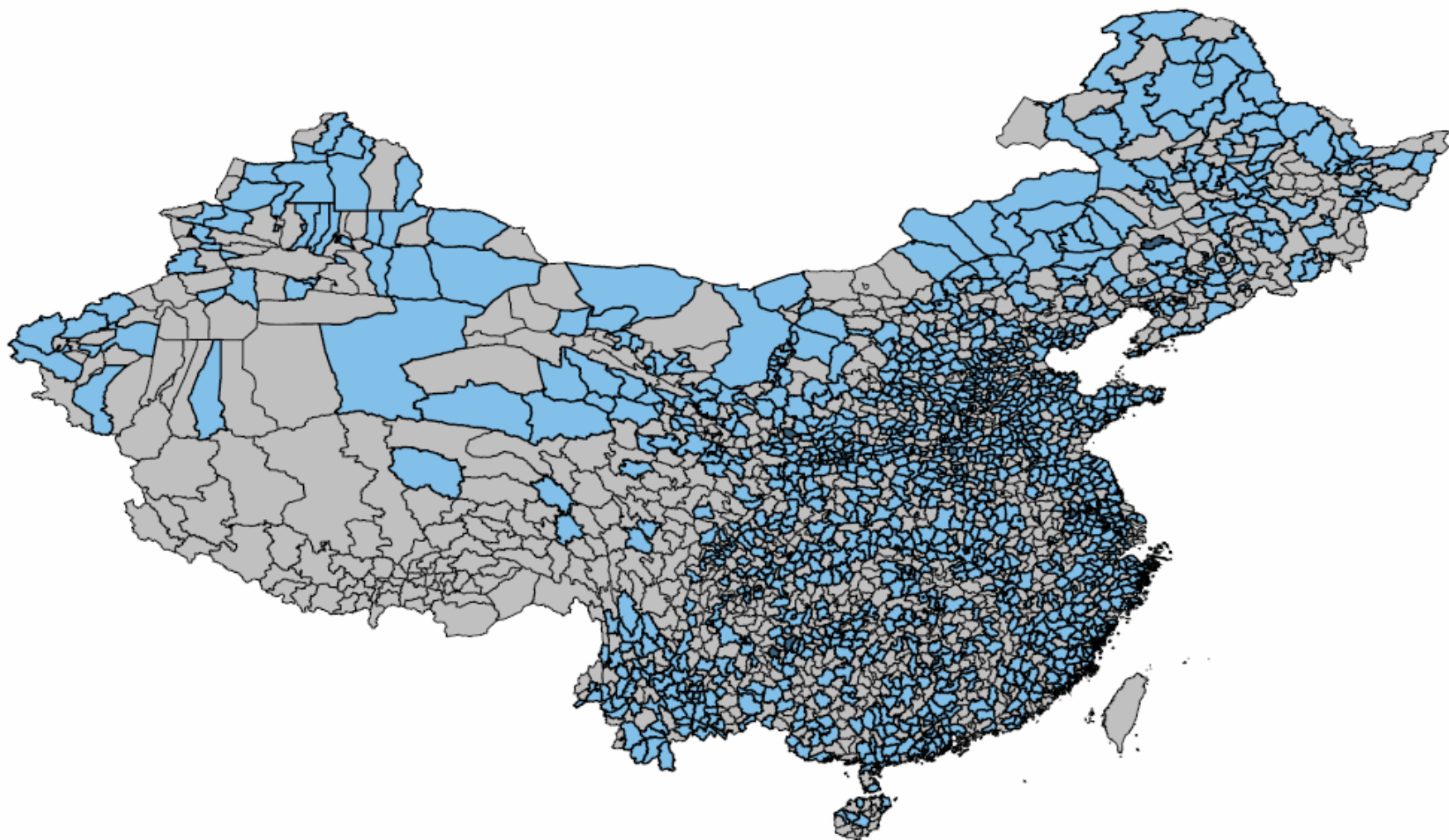
Ultrasound availability in 1977
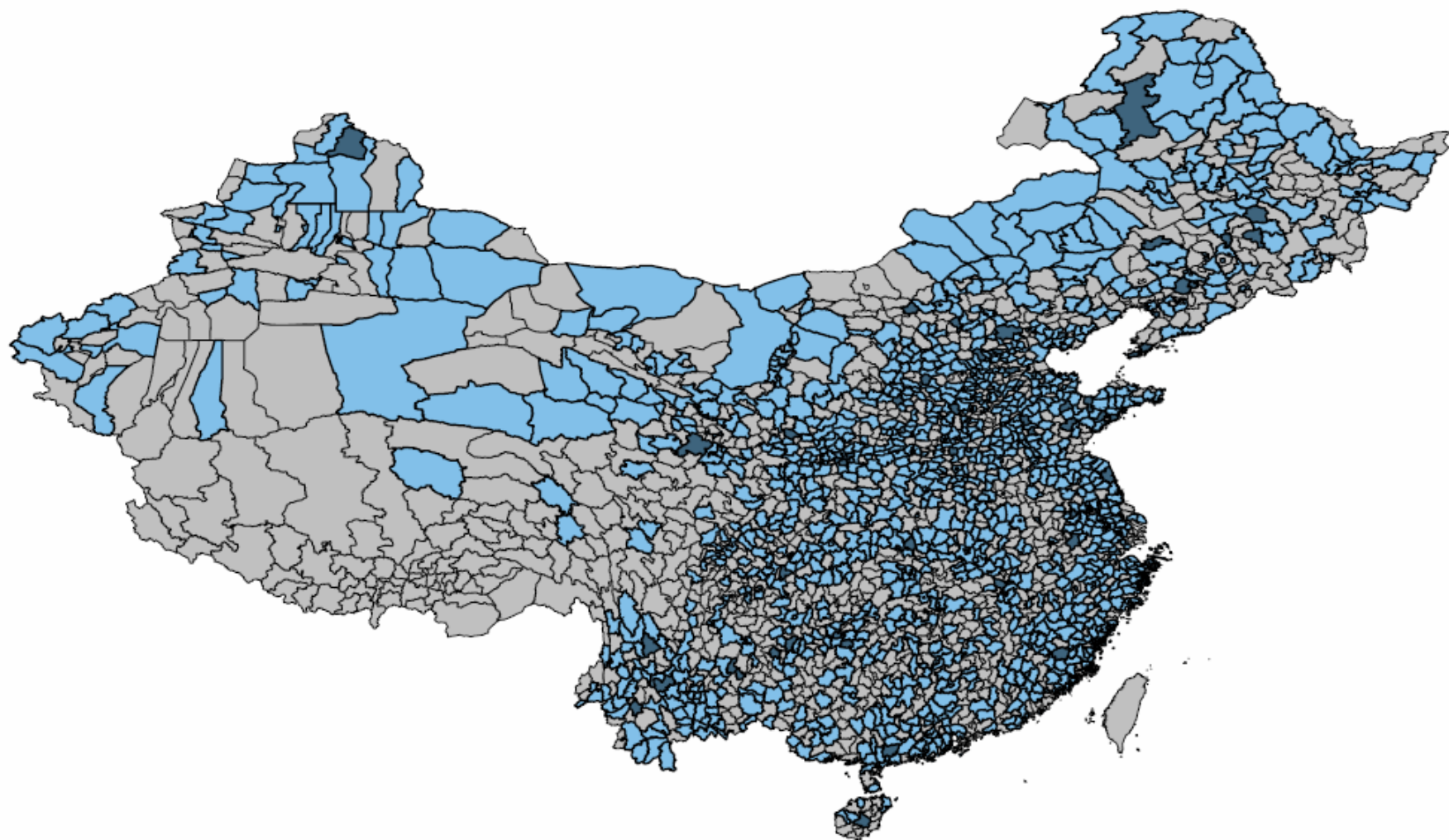dark blue = ultrasound. light blue = no ultrasound. grey = no data

Ultrasound availability in 1978
dark blue = ultrasound. light blue = no ultrasound. grey = no data

Ultrasound availability in 1979
dark blue = ultrasound. light blue = no ultrasound. grey = no data

Ultrasound availability in 1980
dark blue = ultrasound. light blue = no ultrasound. grey = no data

Ultrasound availability in 1981
dark blue = ultrasound. light blue = no ultrasound. grey = no data

Ultrasound availability in 1982
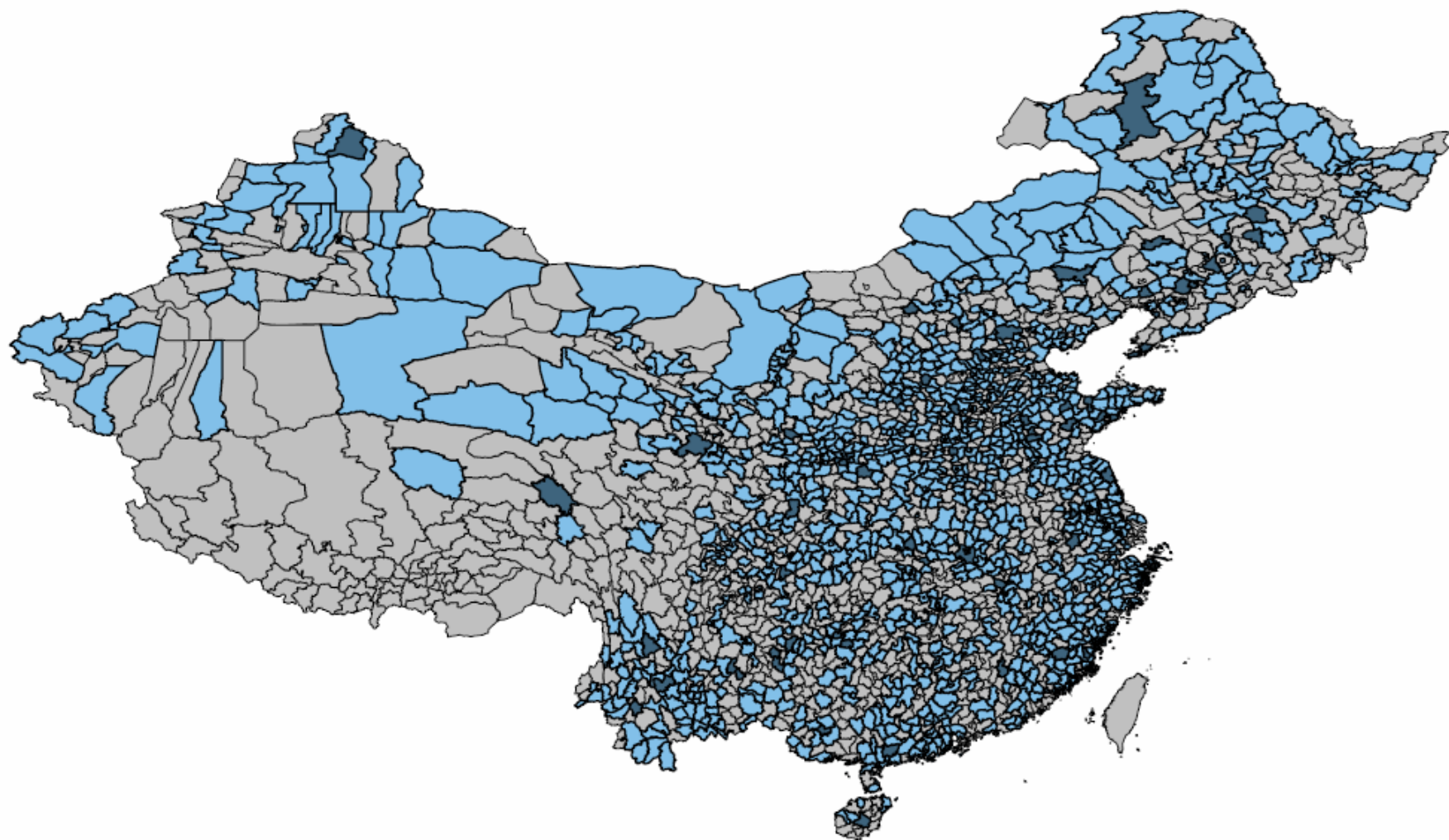dark blue = ultrasound. light blue = no ultrasound. grey = no data

Ultrasound availability in 1983
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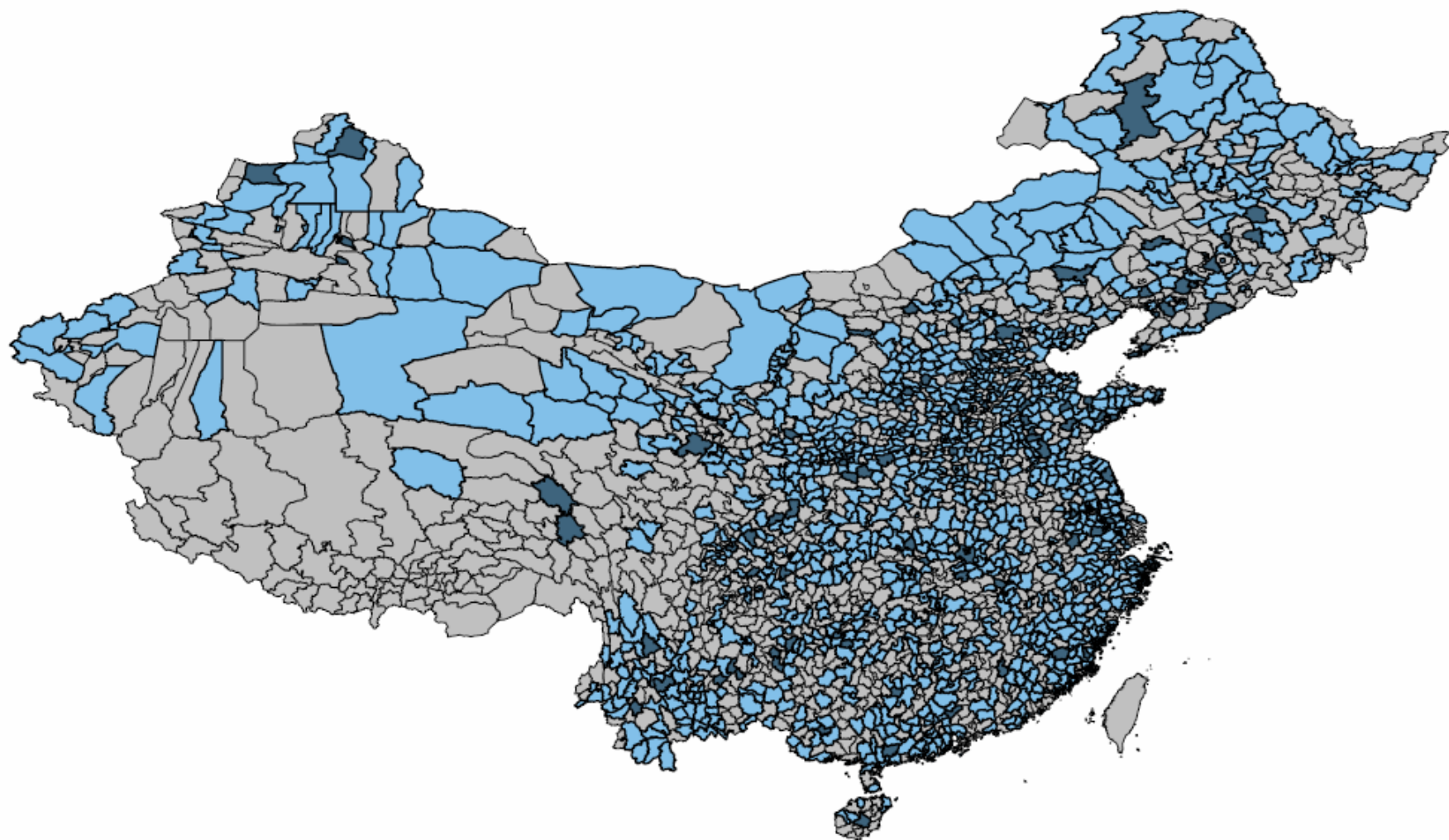
Ultrasound availability in 1984
dark blue = ultrasound. light blue = no ultrasound. grey = no data

Ultrasound availability in 1985
dark blue = ultrasound. light blue = no ultrasound. grey = no data

Ultrasound availability in 1986
dark blue = ultrasound. light blue = no ultrasound. grey = no data
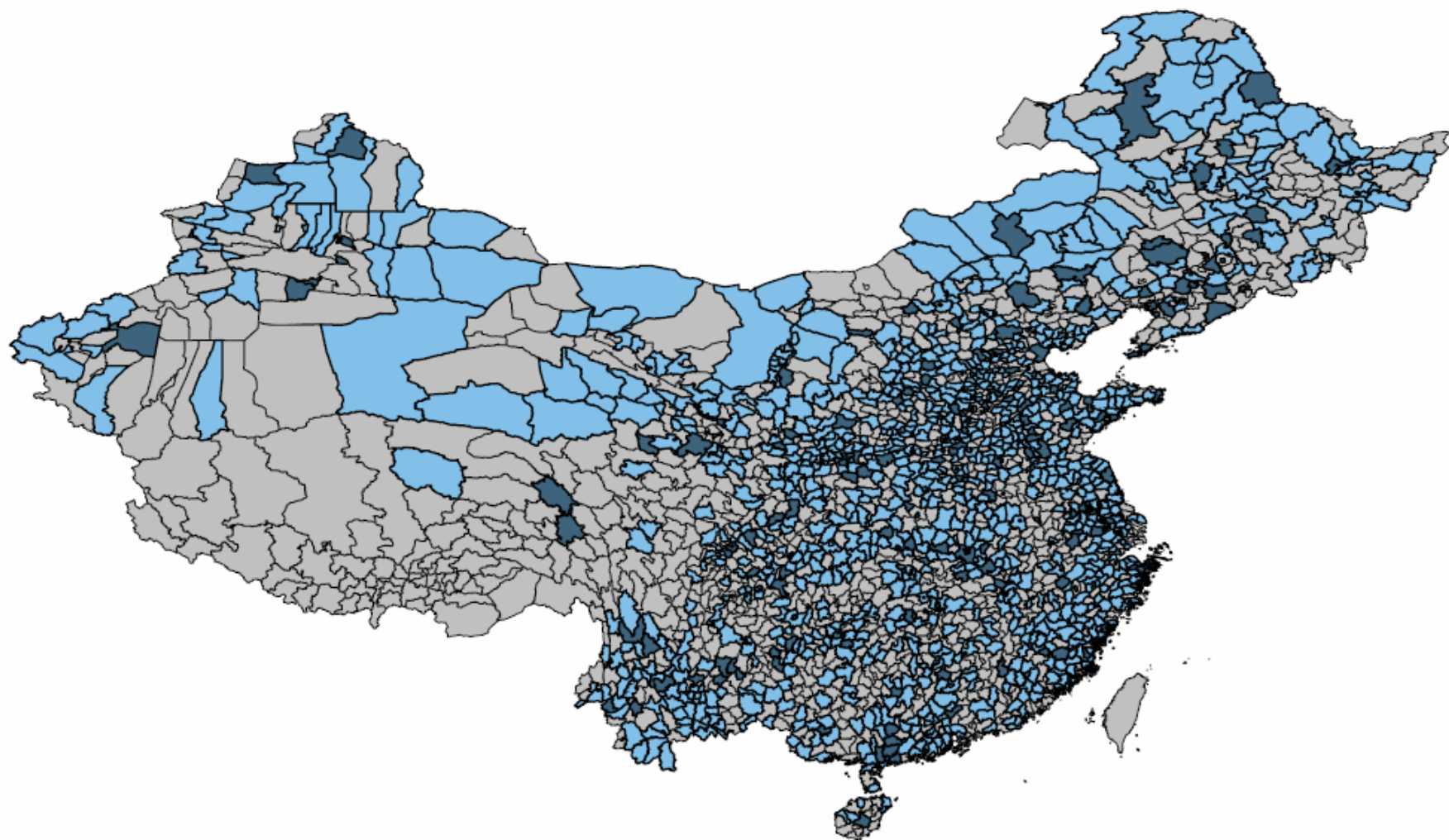
Ultrasound availability in 1987
dark blue = ultrasound. light blue = no ultrasound. grey = no data

Ultrasound availability in 1988
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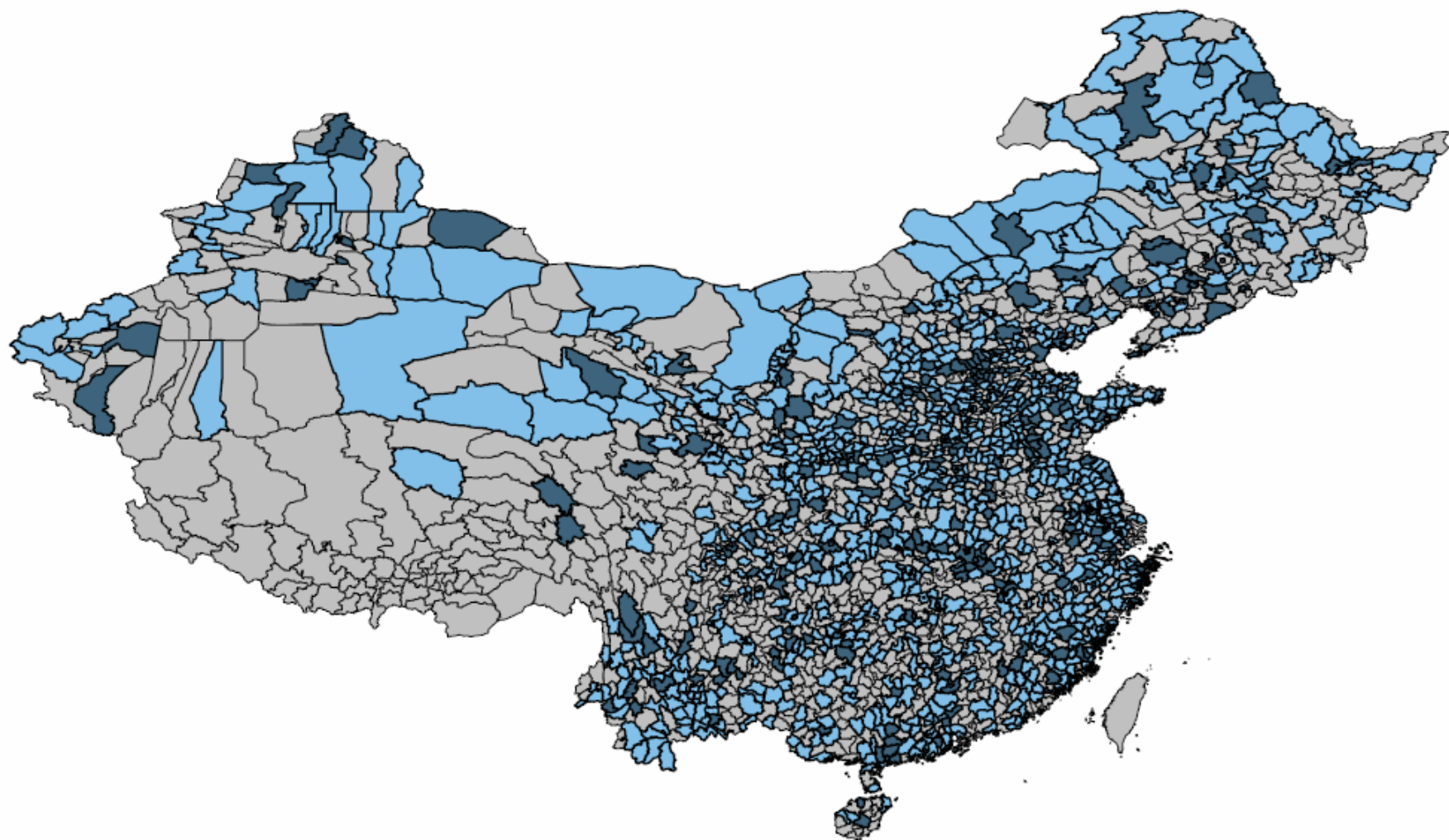
Ultrasound availability in 1989
dark blue = ultrasound. light blue = no ultrasound. grey = no data
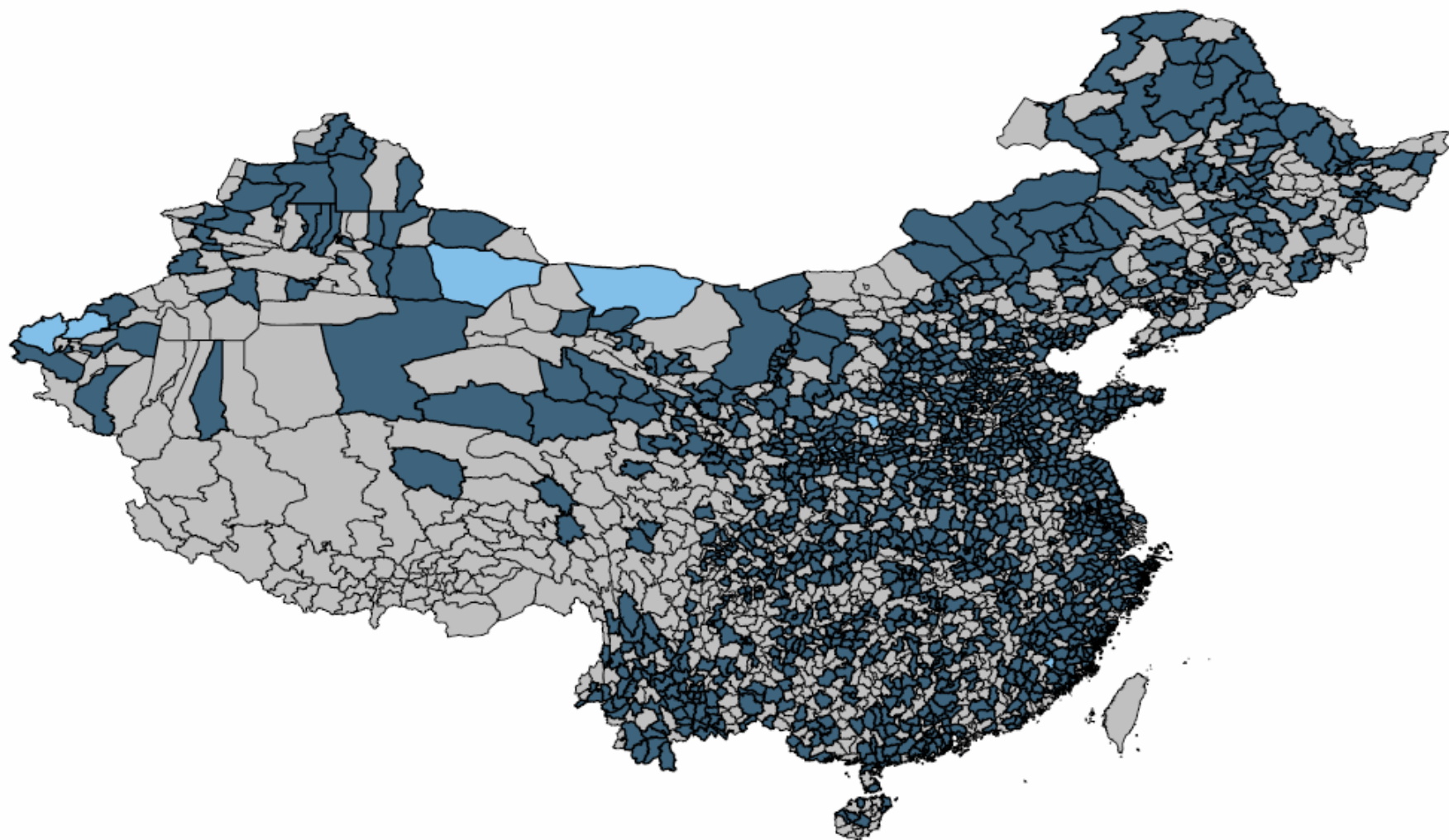
Ultrasound availability in 1990
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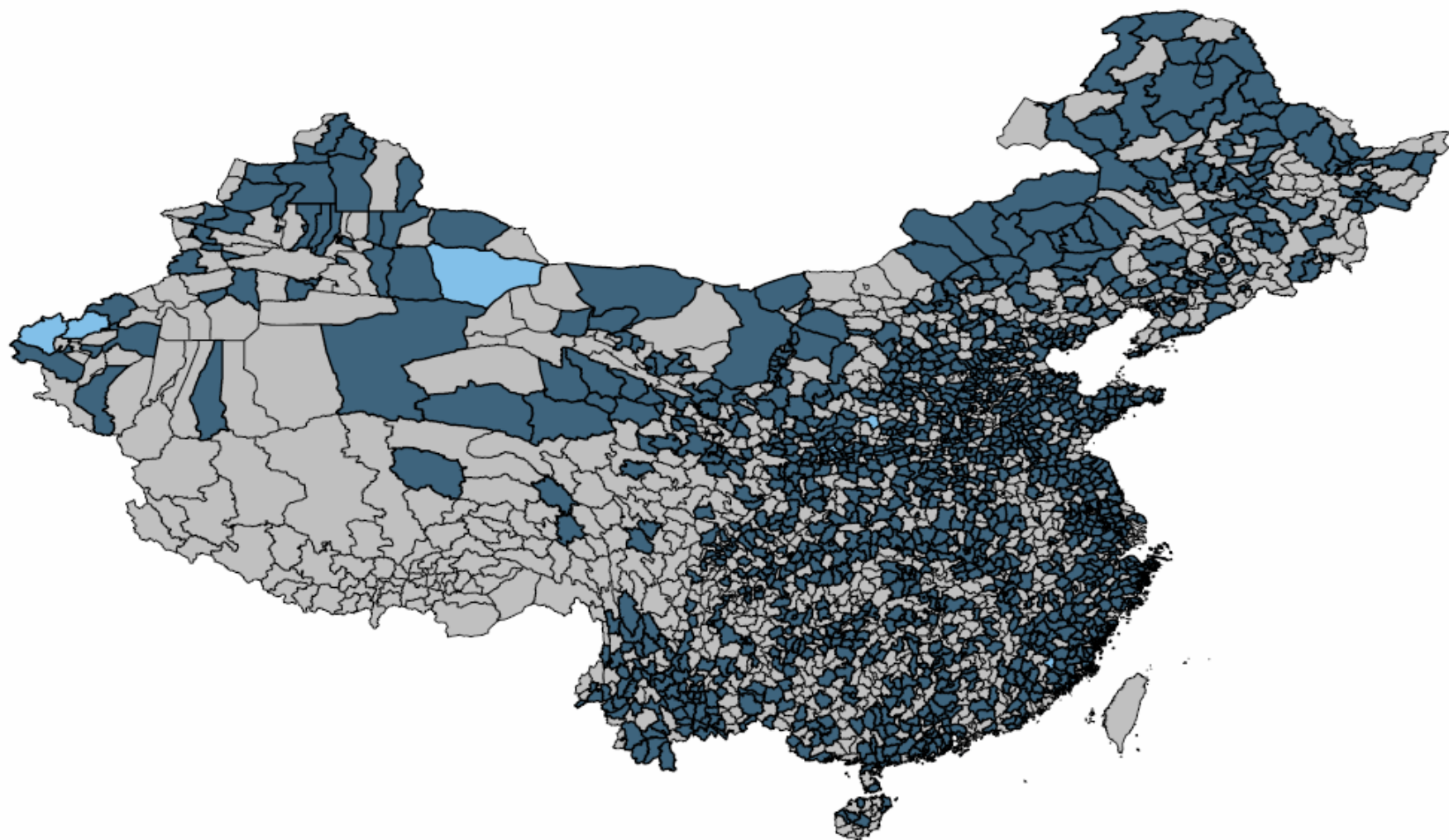
Ultrasound availability in 1991
dark blue = ultrasound. light blue = no ultrasound. grey = no data
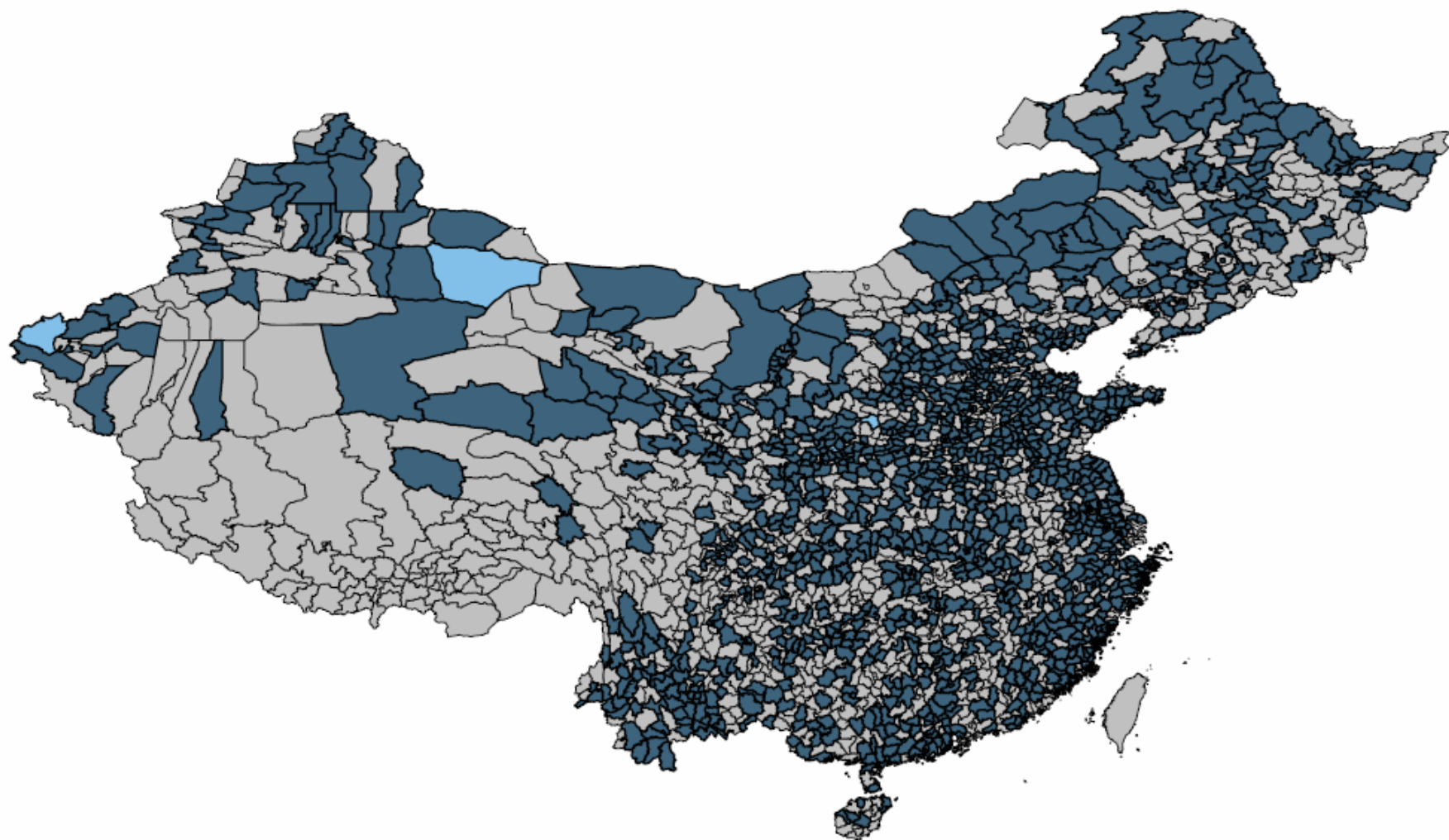
Ultrasound availability in 1992
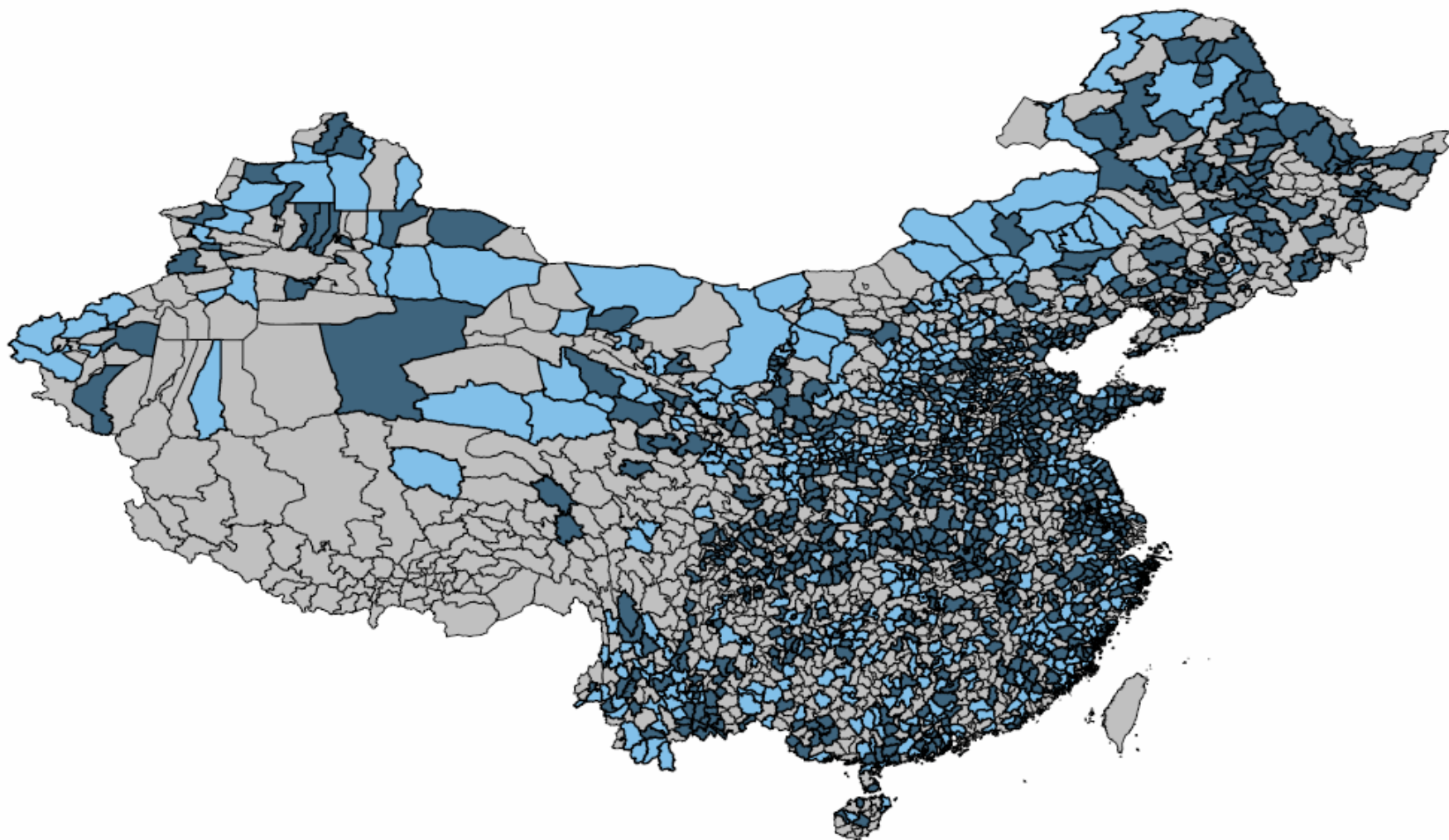dark blue = ultrasound. light blue = no ultrasound. grey = no data
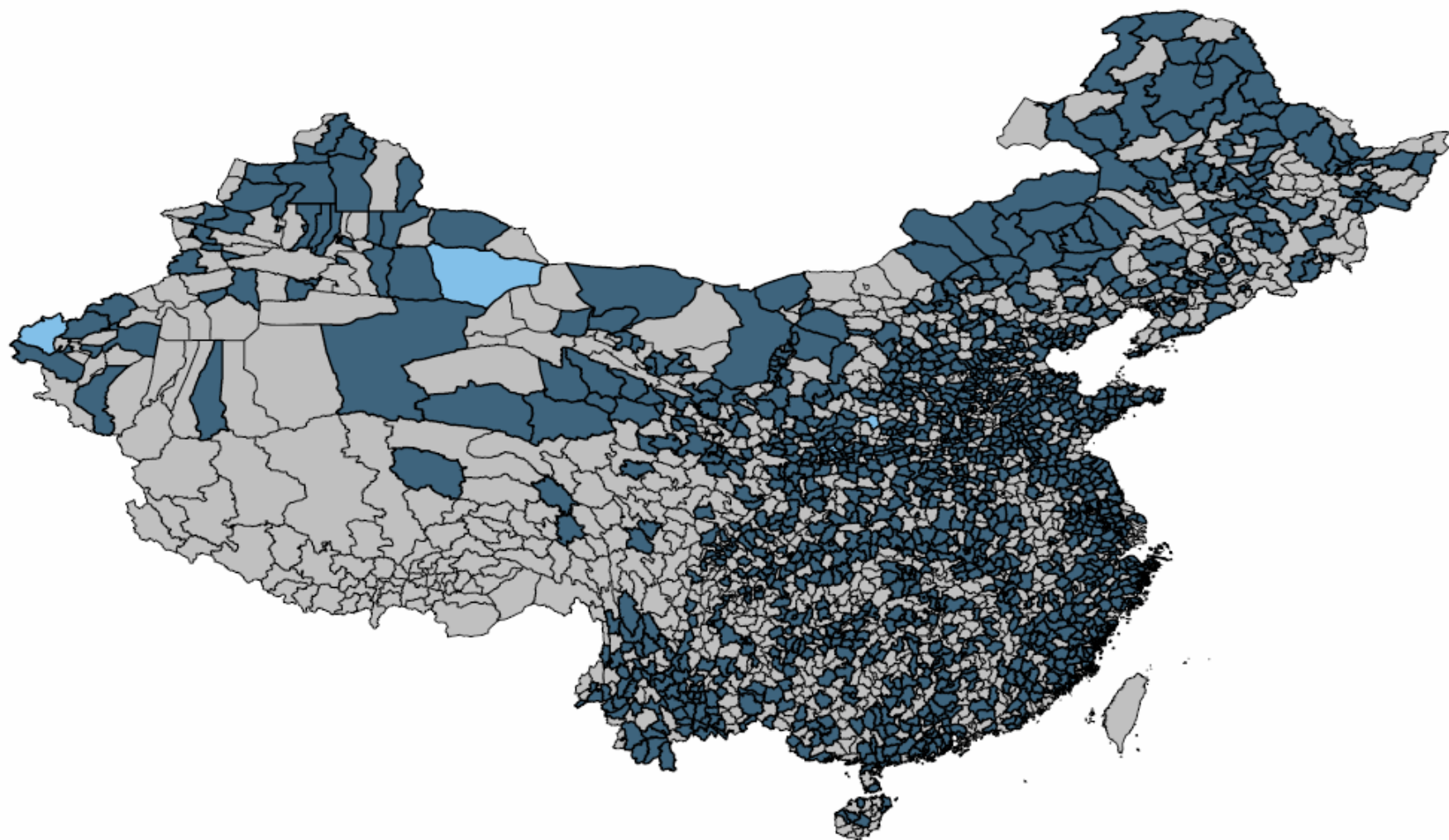
Ultrasound availability in 1993
dark blue = ultrasound. light blue = no ultrasound. grey = no data
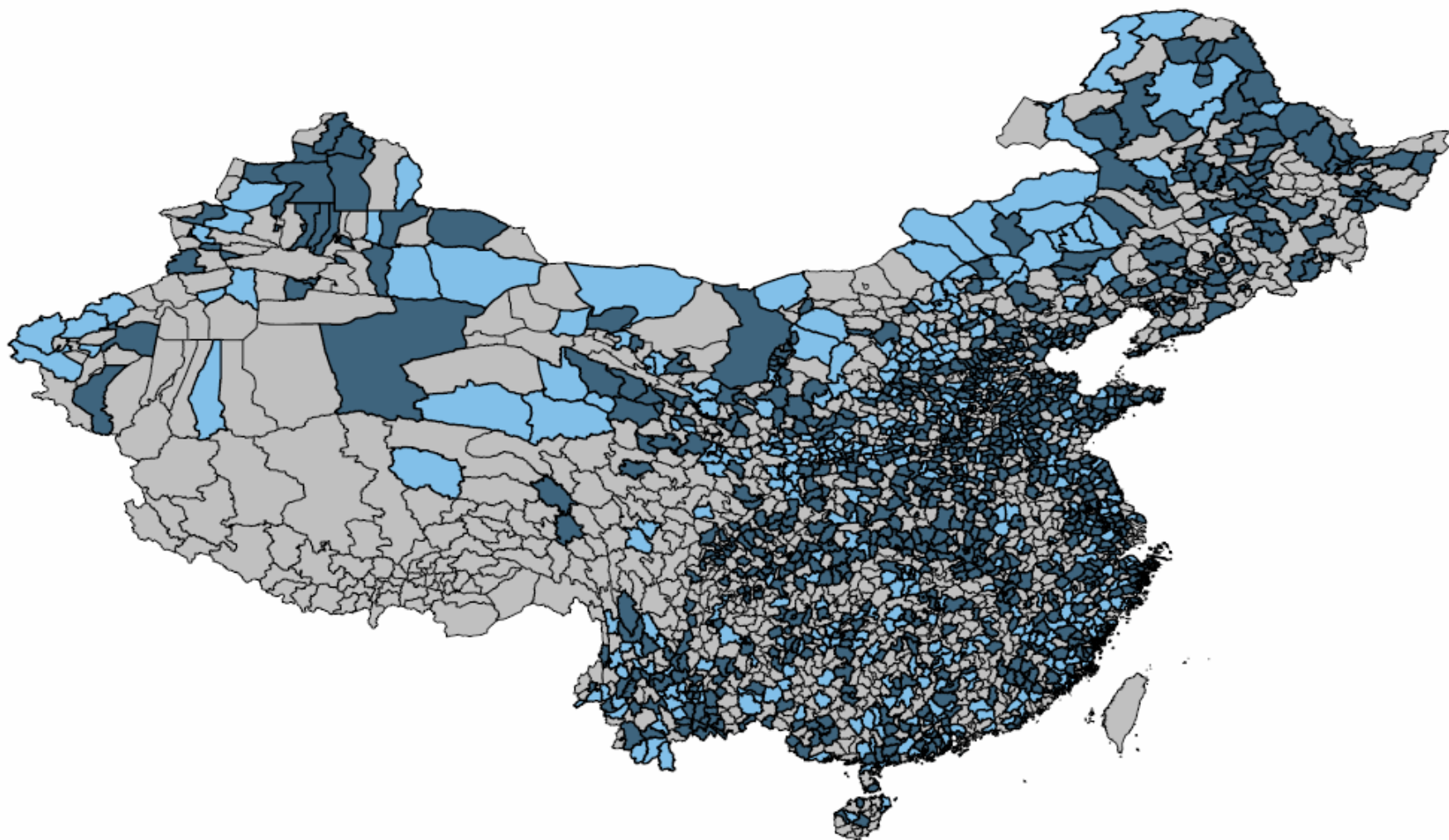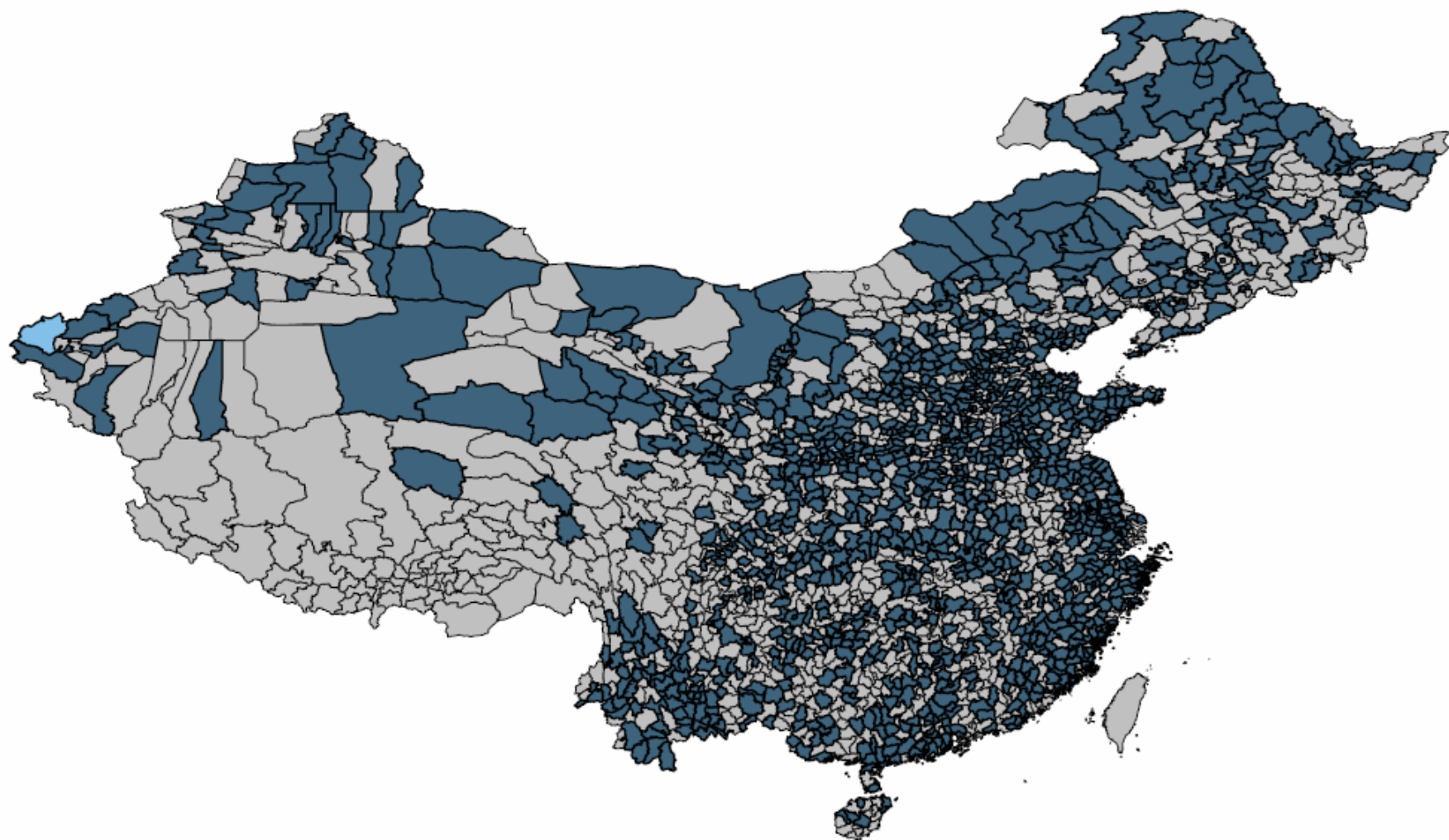
Ultrasound availability in 1994
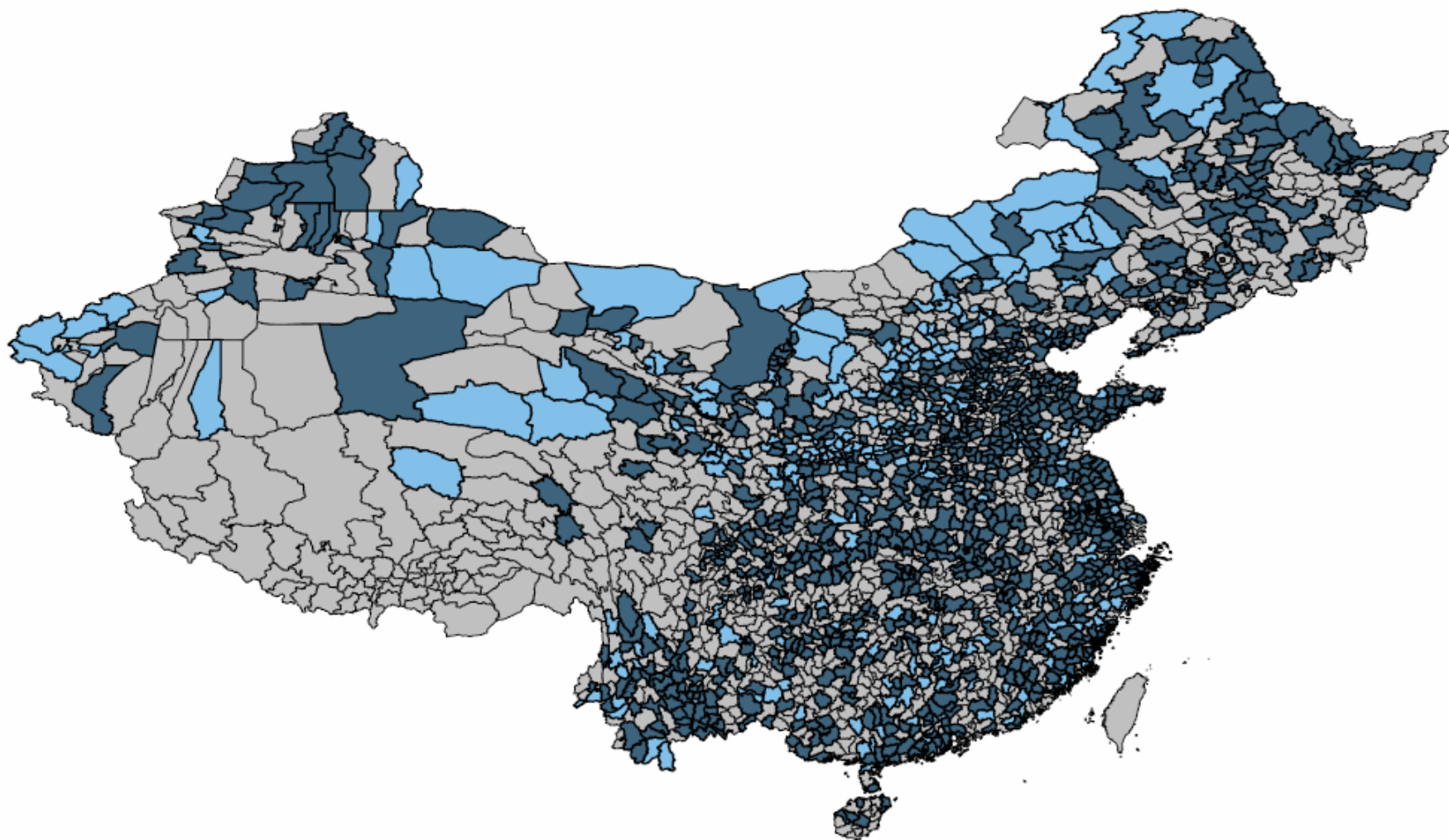dark blue = ultrasound. light blue = no ultrasound. grey = no data
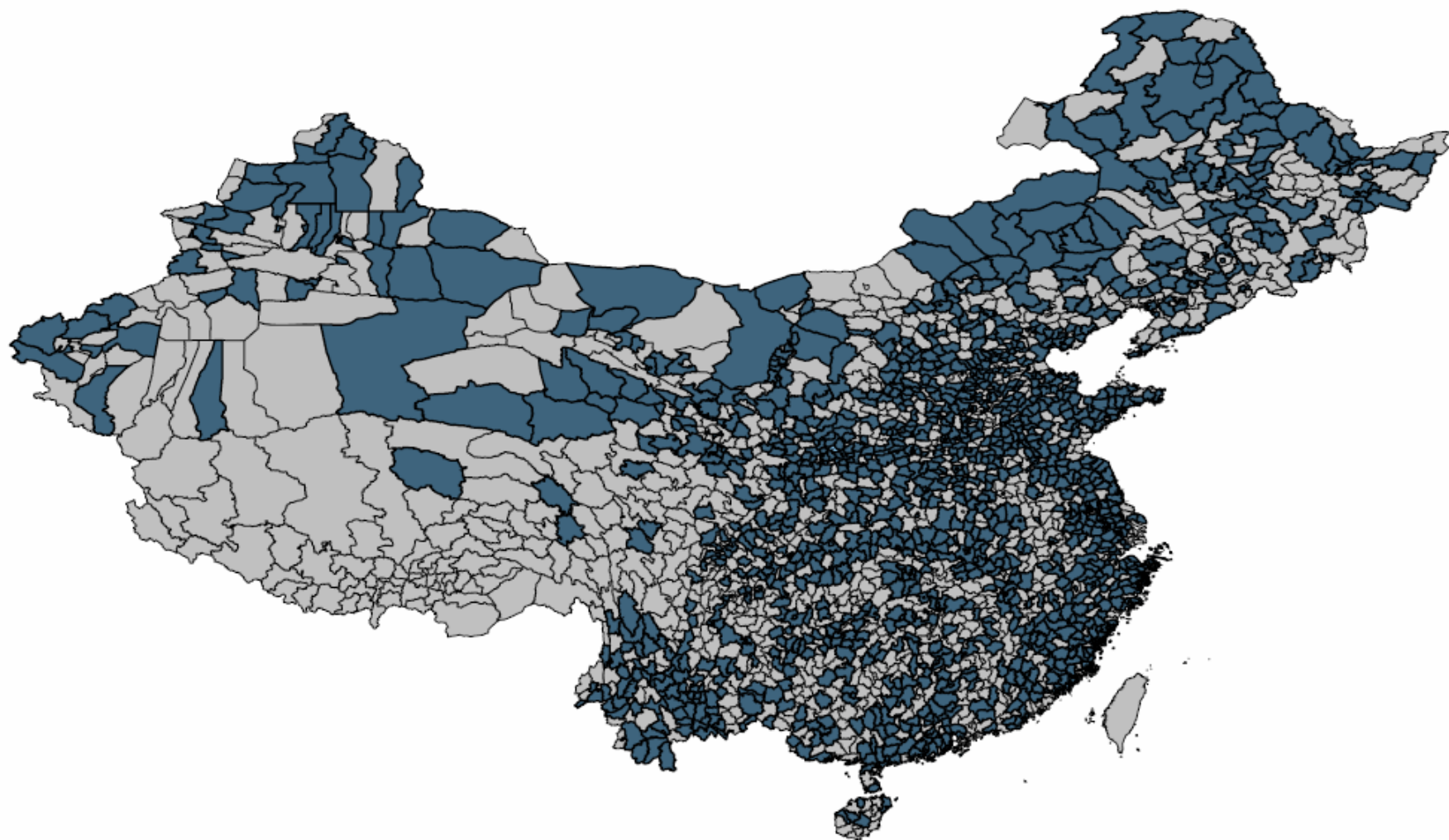
Ultrasound availability in 1995
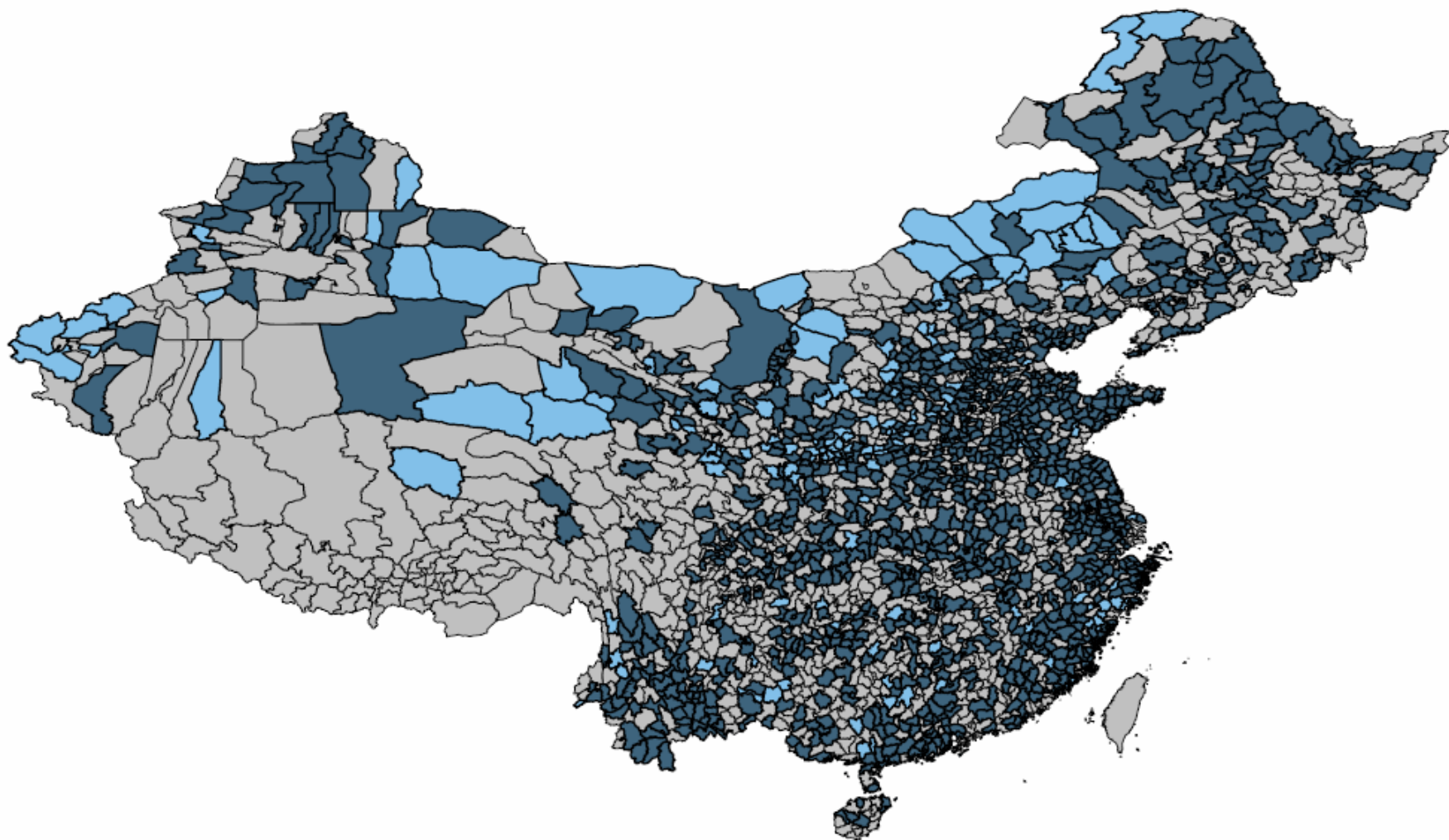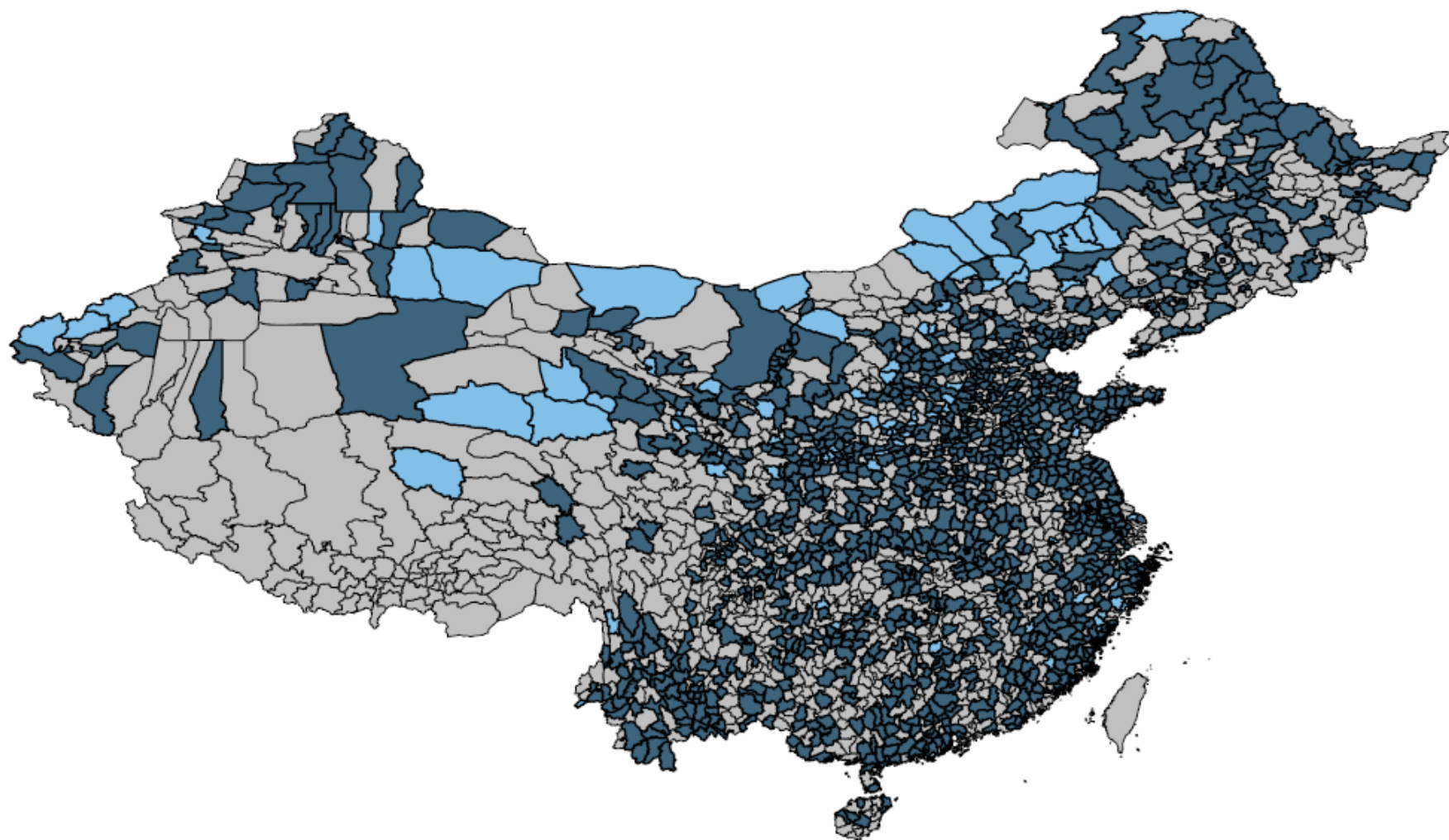dark blue = ultrasound. light blue = no ultrasound. grey = no data

Percent of Counties with Ultrasound Machines in the Data
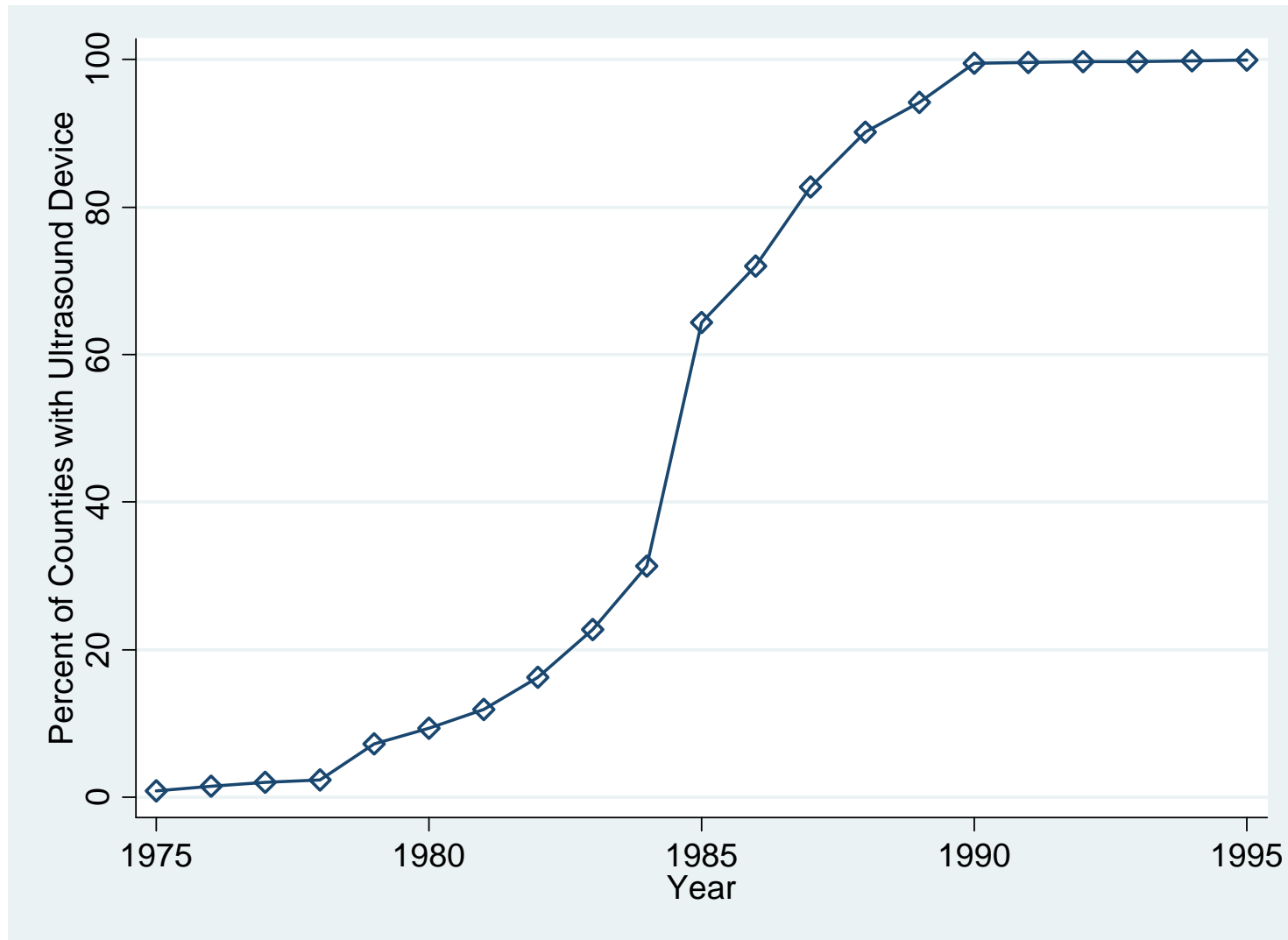
Data: Births

- Chinese Children Survey
  - Conducted by the National Bureau of Statistics of China in June 1992
  - Representative national data:

    560,000 households and two million individuals
  - Pregnancy history records for women
    - Pregnancy order, time of conception, use of prenatal care, gestation
    - pregnancy outcome (miscarriage, abortion, birth …)
    - Live births: gender, DOB
  - Advantage: directly observe sex ratio *at birth* rather than sex ratio at age 0 in earlier studies

Variables	Observations	Mean	Standard Deviation
Panel A: Pregnancies			
Birth	614408	0.84	0.37
Abortion	614408	0.13	0.33
Miscarriage	614408	0.03	0.16
Still birth	614408	0.004	0.060
Panel B: Births			
Male child	512201	0.53	0.50
First birth	512201	0.60	0.49
Second birth	512201	0.29	0.45
Third (or higher order) birth	512201	0.12	0.32
Urban	514389	0.30	0.46
Han	514389	0.87	0.34
Maternal education	514389	5.86	4.22
Maternal age (at conception)	514389	26.34	7.33
Household income (in 1992)	501333	3816.35	3221.12
Gestation (months)	514389	9.28	0.56
No prenatal care	514389	0.47	0.50
First trimester initial visit	514389	0.18	0.39
Second trimester initial visit	514389	0.16	0.37
Third trimester initial visit	514389	0.16	0.37
Ultrasound (available in county)	299935	0.41	0.49

Notes:

Panel A contains pregnancies that started between January 1974 and June 1992.

Panel B contains births occurred between January 1975 and June 1992.

Both samples are from the Chinese Children Survey.

Information on ultrasound access is collected by the author.

Sex Ratio at Birth and Abortion Ratio by Year
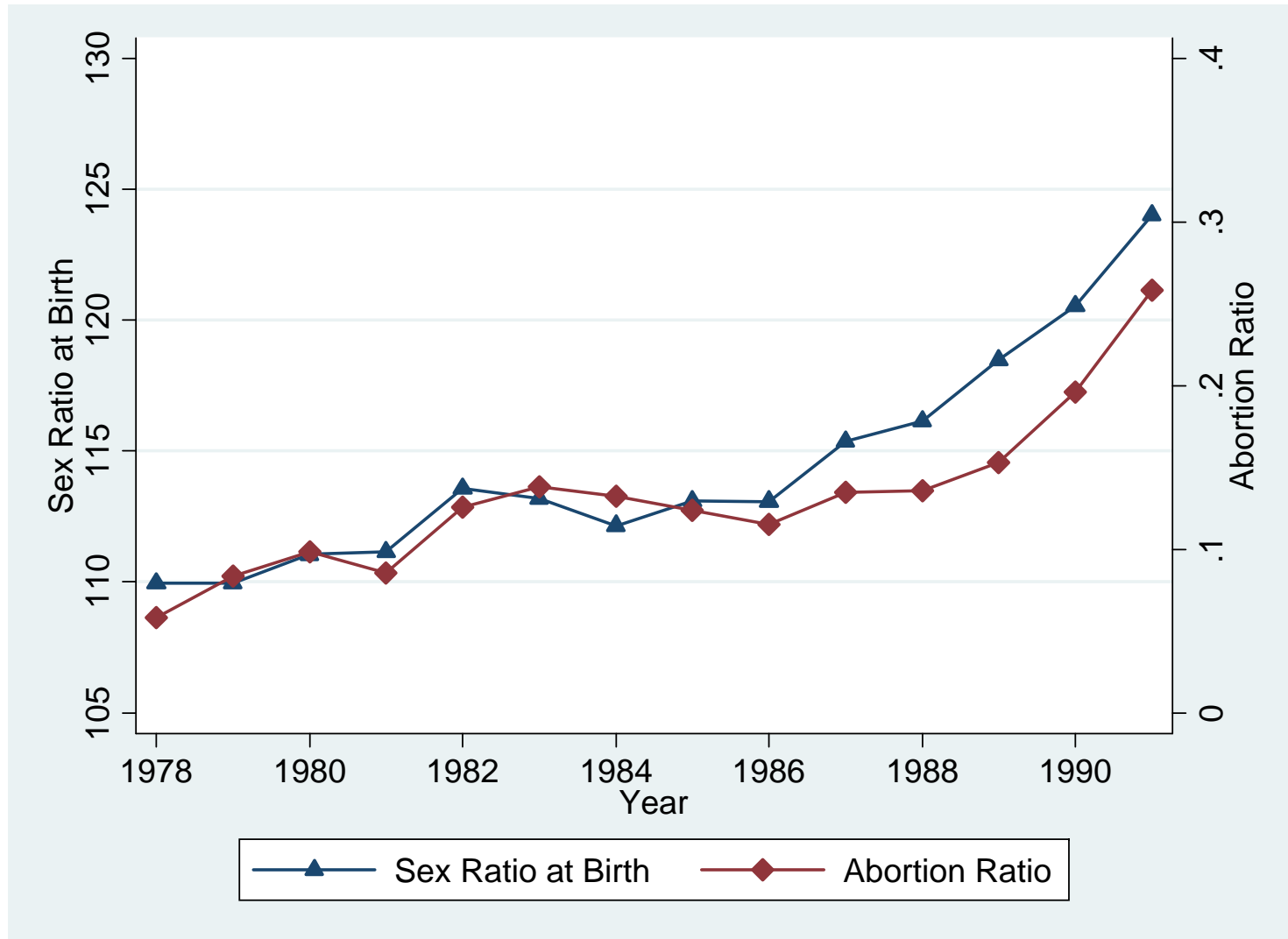
Sex Ratio at Birth and Abortion Ratio
by Pregnancy Year and Pregnancy Order
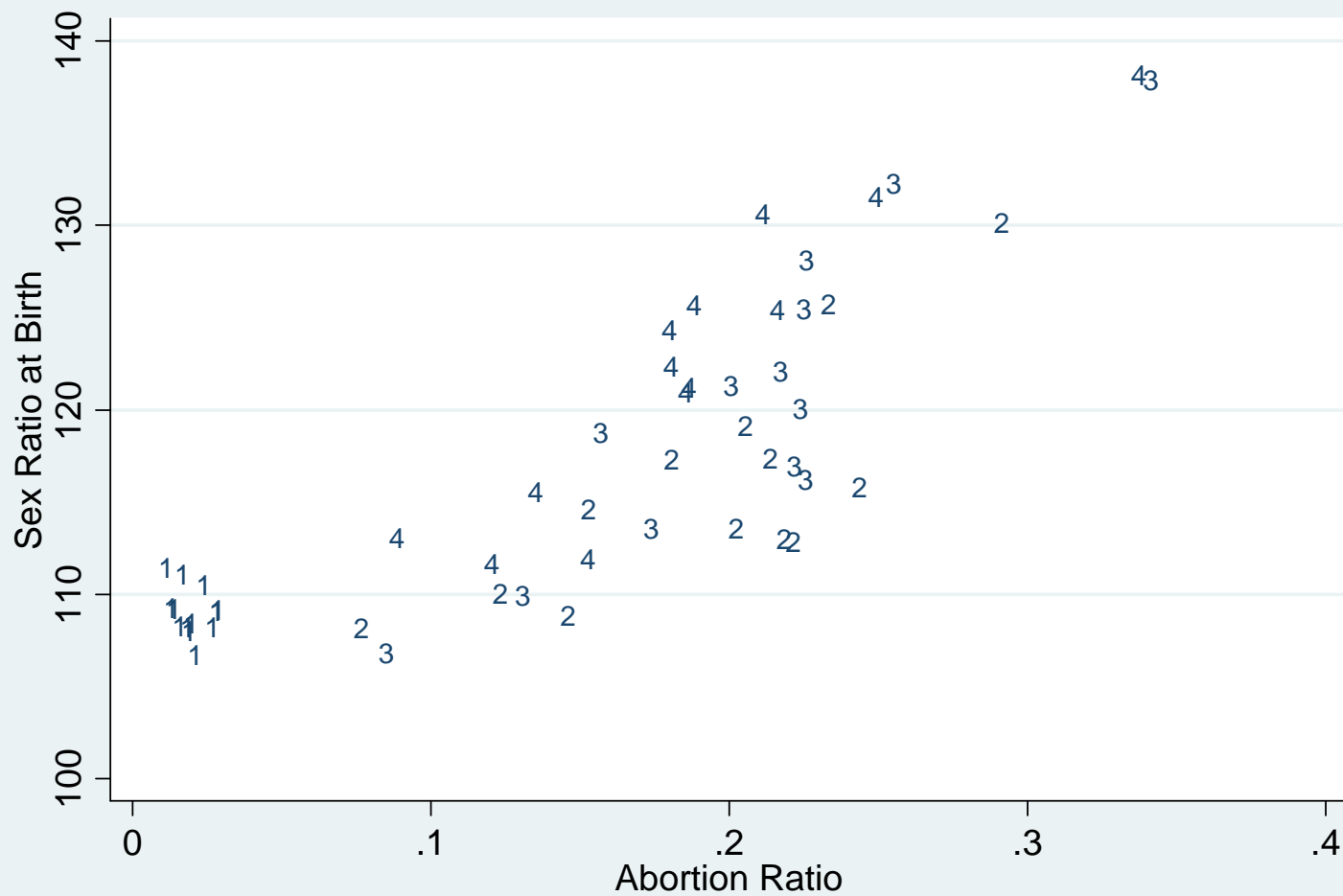
Aggregated to pregnancy year, pregnancy order cells: 1978-1990
1, 2 and 3 denote 1st, 2nd and 3rd pregnancies; 4 indicates 4th and above

Sex Ratio at Birth by Parity and by Year
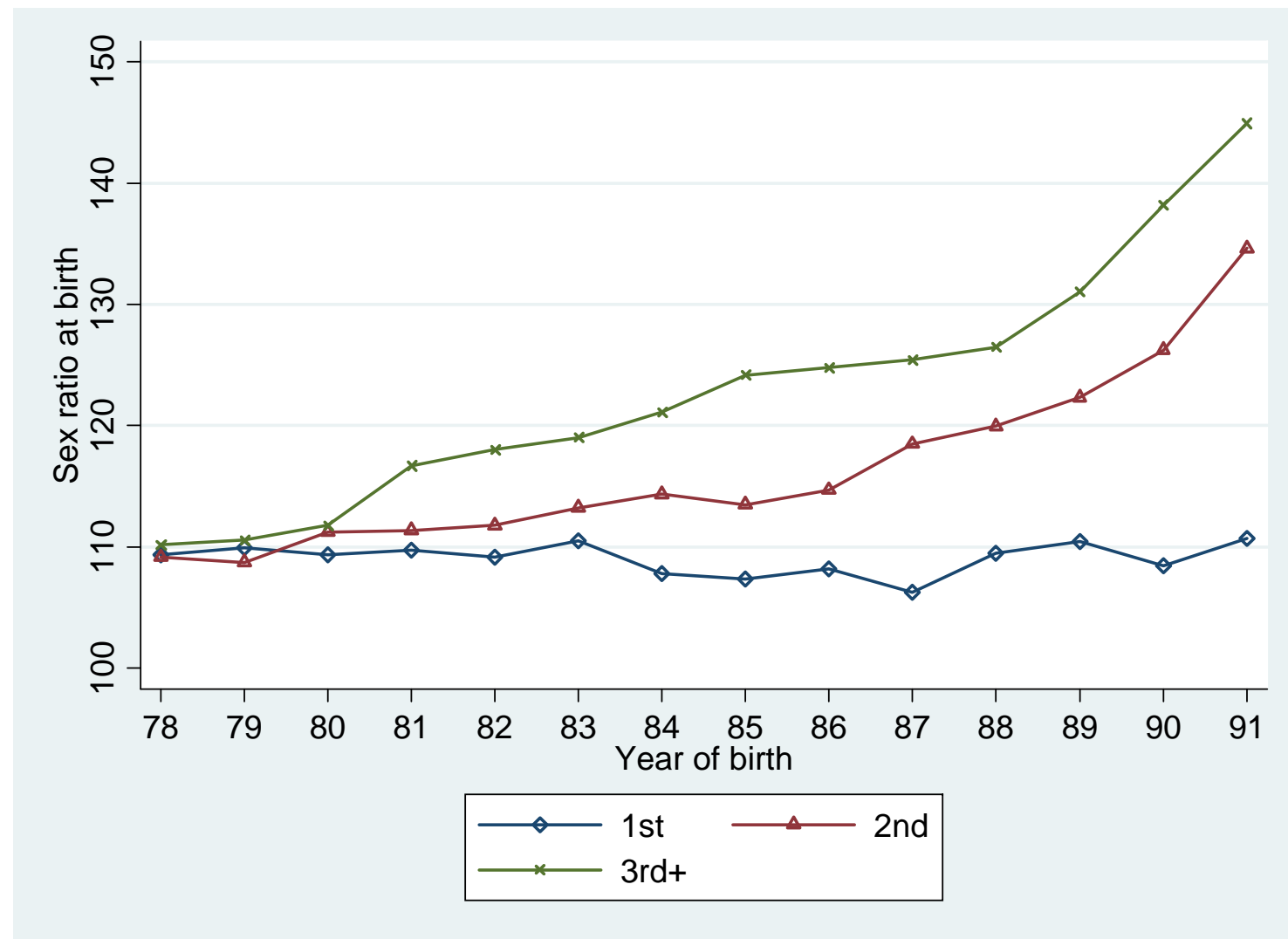
Sex Ratio at Birth by Parity and Sex of Older Sibling(s) over Time

(a)   First birth and higher order birth
      without brother(s)
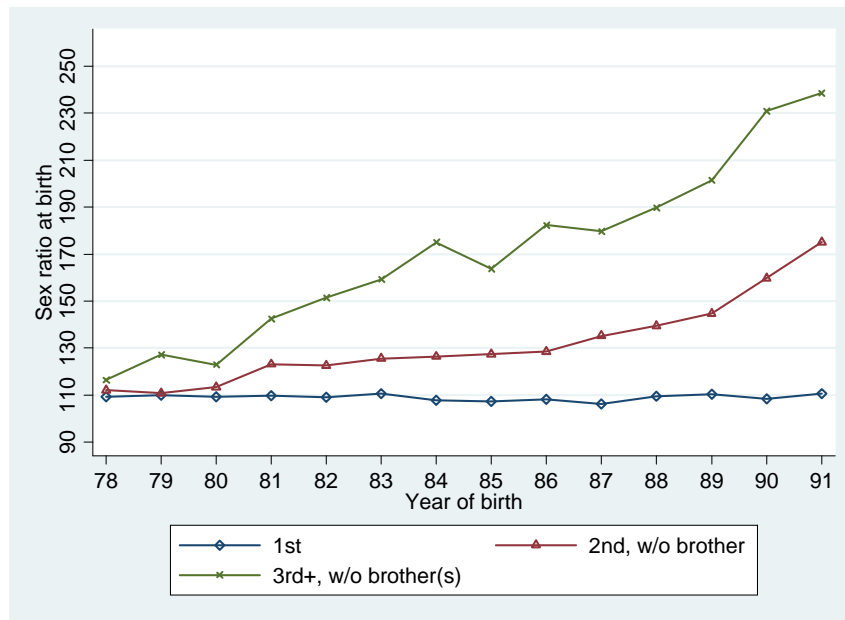
(b)   First birth and higher order birth
      with brother(s)
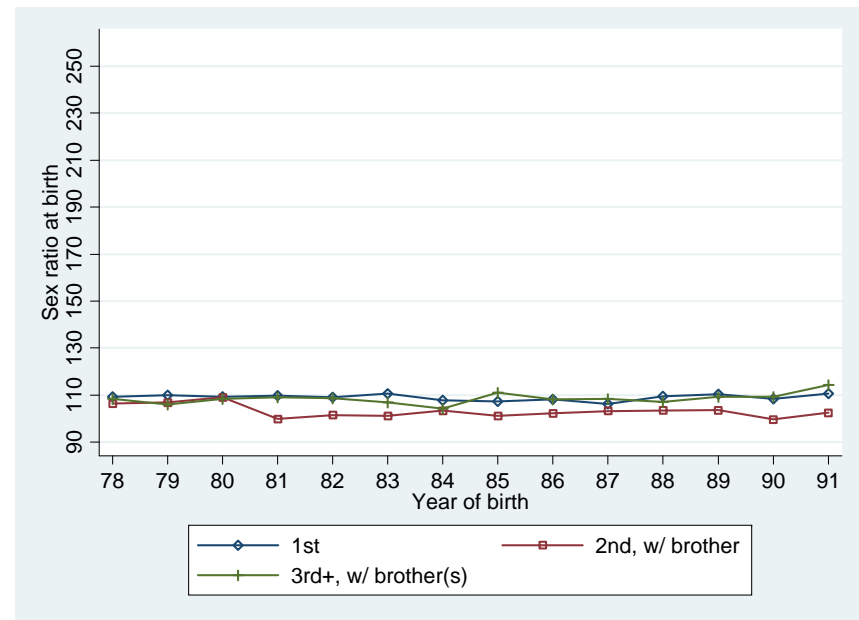
Methodology

To use the county by year variation in local access to ultrasound

- Identification comes from variation across counties across birth cohorts in adoption of ultrasound
- Women who became pregnant after the introduction of ultrasound should have better knowledge of the fetal sex than those who became pregnant prior to the introduction of ultrasound
- Controls for county fixed effects, year fixed effects and mother- and pregnancy-specific characteristics

Allowing the effect to vary with birth order and sex-mix of older siblings

- Opportunity cost of having a child of the "unwanted" sex grows with family size
- Even more true for couples without son(s)

Empirical Approach

- Sample of *all* births

$$\text{Boy}_{ict} = \beta_1 (\text{1st} \times \text{ultrasound}_{ct}) + \beta_2 (\text{2nd} \times \text{ultrasound}_{ct}) + \beta_3 (\text{3rd}^+ \times \text{ultrasound}_{ct})$$
$$+ \beta_4 \text{2nd} + \beta_5 \text{3rd}^+ + X_{ict}\gamma + \mu_c + \nu_t + \epsilon_{ict}$$

Boy = 1 if child is male

1st = 1 if first birth

2nd = 1 if second birth

3rd$^+$ = 1 if third or higher parity birth

ultrasound = 1 if ultrasound is available in the county when mother is pregnant

Empirical Approach

- Sample of *2ⁿᵈ* or *3ʳᵈ* births

$$\text{Boy}_{ict} = \beta_1 \, \text{noboy} + \beta_2 \, \text{ultrasound}_{ct} + \beta_3 \, (\text{noboy} \times \text{ultrasound}_{ct}) + X_{ict}\gamma + \mu_c + \nu_t + \epsilon_{ict}$$

Boy = 1 if child is male

ultrasound = 1 if ultrasound is available in the county when mother is pregnant

noboy = 1 if the mother has no son(s)

Sex Ratio at Birth by Parity and by Availability of Ultrasound
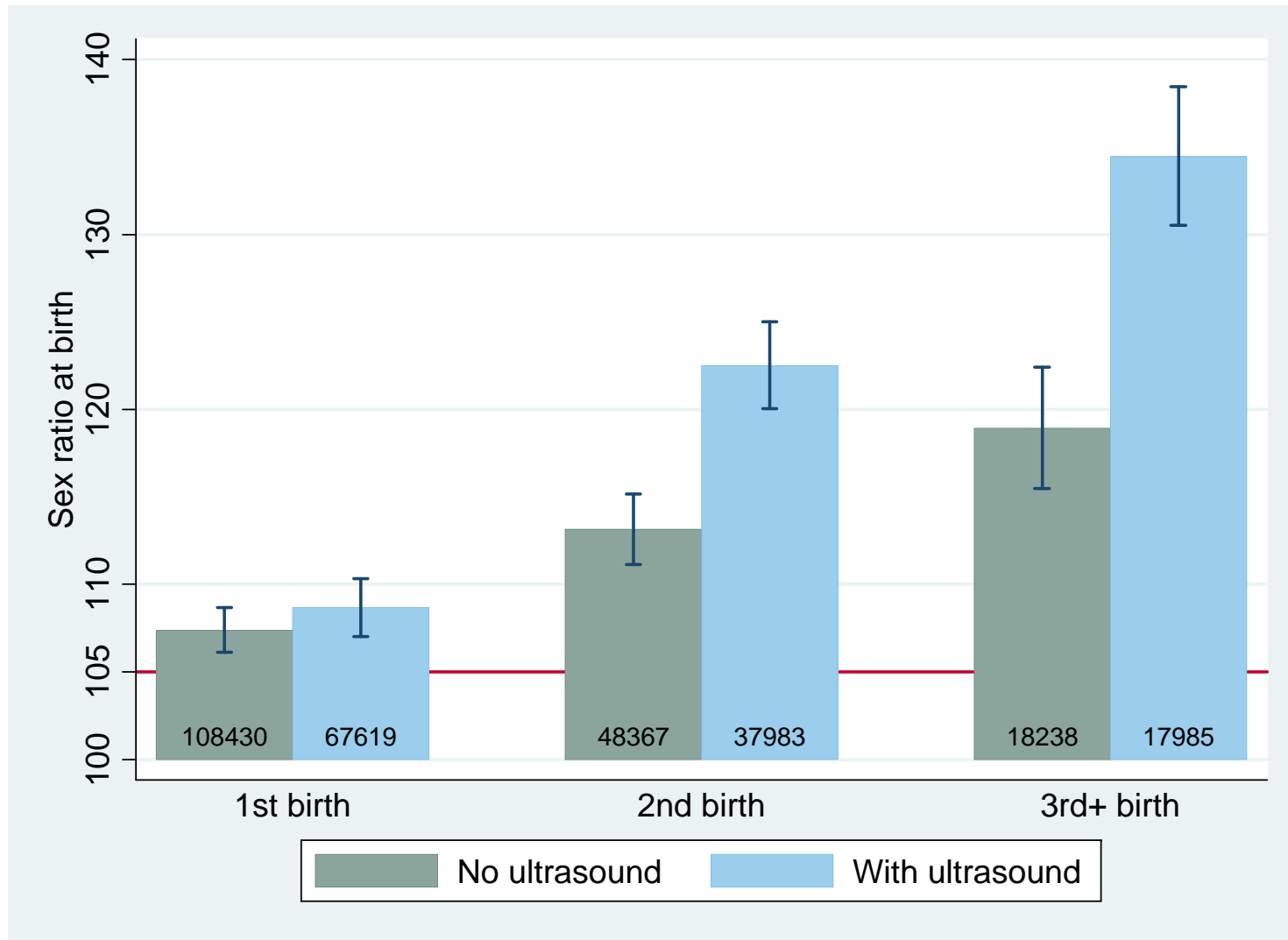
Table II : Effect of Birth Order on Male Probability (Births 1975-1992): Linear Probability Model Results

| | Dependent var.: child is male | | | |
	(1)	(2)	(3)	(4)
Second birth	0.022***	0.024***	0.023***	0.021***
	(0.002)	(0.002)	(0.002)	(0.002)
Third (or higher order) birth	0.039***	0.044***	0.044***	0.041***
	(0.003)	(0.003)	(0.003)	(0.003)
Individual controls	No	Yes	Yes	Yes
County fixed effects	No	No	Yes	Yes
Year (of conception) fixed effects	No	No	No	Yes
Observations	512207	512207	512207	512207
R-squared	0.0008	0.0011	0.0032	0.0035

Notes: Individual controls include mother's ethnicity, education, maternal age at conception and its squared term, gestation length and indicators for the timing of initial prenatal care visits. County fixed effects are separate indicator variables for each county. Year fixed effects are indicators that allow for unrestricted differences in year-to-year changes. Reported in parentheses are standard errors clustered by county. *denotes statistical significance at the 10% level, ** at the 5% level, *** at the 1% level.

Table III : Effect of Birth Order, Ultrasound Availability, and Their Interactions on Male Probability
(Births 1975-1992): Linear Probability Model Results

| | Dependent var.: child is male | | | |
	(1)	(2)	(3)	(4)
Second birth	0.013***	0.015***	0.014***	0.011***
	(0.003)	(0.003)	(0.003)	(0.003)
Third (or higher order) birth	0.025***	0.030***	0.030***	0.027***
	(0.004)	(0.004)	(0.004)	(0.004)
First birth × Ultrasound	0.003	0.000	0.003	-0.007*
	(0.003)	(0.003)	(0.003)	(0.004)
Second birth × Ultrasound	0.020***	0.017***	0.019***	0.013***
	(0.003)	(0.004)	(0.004)	(0.004)
Third (or higher order) birth × Ultrasound	0.030***	0.028***	0.030***	0.024***
	(0.006)	(0.006)	(0.006)	(0.006)
Individual controls	No	Yes	Yes	Yes
County fixed effects	No	No	Yes	Yes
Year (of conception) fixed effects	No	No	No	Yes
Observations	298615	298615	298615	298615
R-squared	0.0010	0.0014	0.0033	0.0036

Notes: Individual controls include mother's ethnicity, education, maternal age at conception and its squared term, gestation length and indicators for the timing of initial prenatal care visits. County fixed effects are separate indicator variables for each county. Year fixed effects are indicators that allow for unrestricted differences in year-to-year changes. Reported in parentheses are standard errors clustered by county. *denotes statistical significance at the 10% level, ** at the 5% level, *** at the 1% level.

Table IV : Effect of Ultrasound, Sex Composition of the First Child, and Their Interactions on Male Probability (Births 1975-1992): Linear Probability Model Results from the Second Births

	Dependent var.: child is male			
	(1)	(2)	(3)	(4)
First child is female	0.035***	0.035***	0.035***	0.035***
	(0.006)	(0.006)	(0.006)	(0.006)
Ultrasound	-0.004	-0.009*	-0.003	-0.015*
	(0.005)	(0.005)	(0.006)	(0.008)
First child is female × Ultrasound	0.047***	0.047***	0.048***	0.048***
	(0.008)	(0.008)	(0.008)	(0.008)
Individual controls	No	Yes	Yes	Yes
County fixed effects	No	No	Yes	Yes
Year (of conception) fixed effects	No	No	No	Yes
Observations	86351	86351	86351	86351
R-squared	0.0041	0.0048	0.0108	0.0113

Notes: Individual controls include mother's ethnicity, education, maternal age at conception and its squared term, gestation length and indicators for the timing of initial prenatal care visits. County fixed effects are separate indicator variables for each county. Year fixed effects are indicators that allow for unrestricted differences in year-to-year changes. Reported in parentheses are standard errors clustered by county. *denotes statistical significance at the 10% level, ** at the 5% level, *** at the 1% level.

Table V : Effect of Ultrasound, Sex Composition of the First Two Children, and Their Interactions on Male Probability (Births 1975-1992): Linear Probability Model Results from the Third Births

	Dependent var.: child is male			
	(1)	(2)	(3)	(4)
First two children are both female	0.083***	0.081***	0.083***	0.083***
	(0.011)	(0.011)	(0.011)	(0.011)
Ultrasound	0.003	-0.001	0.004	-0.012
	(0.008)	(0.008)	(0.009)	(0.013)
First two children are both female × Ultrasound	0.065***	0.065***	0.069***	0.068***
	(0.014)	(0.014)	(0.014)	(0.014)
Individual controls	No	Yes	Yes	Yes
County fixed effects	No	No	Yes	Yes
Year (of conception) fixed effects	No	No	No	Yes
Observations	26958	26958	26958	26958
R-squared	0.0143	0.0165	0.0310	0.0315

Notes: Individual controls include mother's ethnicity, education, maternal age at conception and its squared term, gestation length and indicators for the timing of initial prenatal care visits. County fixed effects are separate indicator variables for each county. Year fixed effects are indicators that allow for unrestricted differences in year-to-year changes. Reported in parentheses are standard errors clustered by county. *denotes statistical significance at the 10% level, ** at the 5% level, *** at the 1% level.

Threats to Identification

- One Child Policy
  - Identified in past studies as one contributing factor to high sex ratio at birth
  - Has both regional and time variation
- Differential trends in sex ratio at birth

Table VI : The Effect of Ultrasound Availability, and Its Interactions with One Child Policy Enforcement on Male Probability (Births 1979-1992): Linear Probability Model Results

	Dependent var.: child is male	
	(1)	(2)
First birth × Ultrasound	-0.006	-0.006
	(0.004)	(0.004)
Second birth × Ultrasound	0.010**	0.008
	(0.005)	(0.005)
Third (or higher order) birth × Ultrasound	0.020***	0.019***
	(0.007)	(0.007)
Birth rate × First birth	0.032	0.021
	(0.045)	(0.052)
Birth rate × Second birth	-0.097*	-0.010
	(0.056)	(0.069)
Birth rate × Third (or higher order) birth	-0.149**	-0.051
	(0.074)	(0.093)
Birth rate × Ultrasound × First birth		0.011
		(0.072)
Birth rate × Ultrasound × Second birth		-0.197**
		(0.094)
Birth rate × Ultrasound × Third (or higher order) birth		-0.211*
		0.0037
Individual controls	Yes	Yes
County fixed effects	Yes	Yes
Year (of conception) fixed effects	Yes	Yes
Observations	257508	257508
R-squared	0.0037	0.0037

Notes: Birth rate is calculated as the number of births divided by the number of women aged 15-49 in the county during the year when the mother became pregnant. For meaningful comparison of estimates across columns, birth rate is demeaned using the sample average. Individual controls include mother's ethnicity, education, maternal age at conception and its squared term, gestation length and indicators for the timing of initial prenatal care visits. County fixed effects are separate indicator variables for each county. Year fixed effects are indicators that allow for unrestricted differences in year-to-year changes. Reported in parentheses are standard errors clustered by county. *denotes statistical significance at the 10% level, ** at the 5% level, *** at the 1% level.

Table VII : The Estimated Effect of Ultrasound Availability and Implementation of the One Child Policy (Births 1979-1992)

Dependent var.: child is male

	Enforcement of One Child Policy			Ethnicity	
	Strong	Medium	Weak	*Han, Zhuang & Manchu*	Smaller ethnic groups
	(1)	(2)	(3)	(4)	(5)
First birth × Ultrasound	-0.006	-0.006	-0.005	-0.007	-0.013
	(0.005)	(0.004)	(0.005)	(0.005)	(0.013)
Second birth × Ultrasound	0.015***	0.009*	0.002	0.012**	0.008
	(0.005)	(0.005)	(0.006)	(0.005)	(0.015)
Third (or higher order) birth × Ultrasound	0.026***	0.020***	0.013	0.025***	0.010
	(0.008)	(0.007)	(0.009)	(0.007)	(0.016)
Evaluation at	25th percentile of birth rate	median of birth rate	75th percentile of birth rate	mean of birth rate	mean of birth rate
Individual controls	Yes	Yes	Yes	Yes	Yes
County fixed effects	Yes	Yes	Yes	Yes	Yes
Year (of conception) fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	257508	257508	257508	227620	29881
R-squared	0.0037	0.0037	0.0037	0.0040	0.0123

Notes: Birth rate is calculated as the number of births divided by the number of women aged 15-49 in the county during the year when the mother became pregnant. Individual controls include mother's ethnicity, education, maternal age at conception and its squared term, gestation length and indicators for the timing of initial prenatal care visits. County fixed effects are separate indicator variables for each county. Year fixed effects are indicators that allow for unrestricted differences in year-to-year changes. Reported in parentheses are standard errors clustered by county. *denotes statistical significance at the 10% level, ** at the 5% level, *** at the 1% level.

Table VIII : Robustness of the Effect of Birth Orders, Ultrasound Availability, and Their Interactions on Male Probability: Linear Probability Model Results

|	Dependent var.: child is male	
	(1)	(2)
First birth × Ultrasound	-0.008*	-0.008*
	(0.005)	(0.005)
Second birth × Ultrasound	0.012**	0.011**
	(0.005)	(0.005)
Third (or higher order) birth × Ultrasound	0.024***	0.023***
	(0.007)	(0.007)
Ultrasound **next year**		-0.004
		(0.006)
Second birth × Ultrasound **next year**		-0.001
		(0.009)
Third (or higher order) birth × Ultrasound **next year**		0.003
		(0.011)
Individual controls	Yes	Yes
County fixed effects	Yes	Yes
Year (of conception) fixed effects	Yes	Yes
Sample	After 1980	1975-1992
1980 county variables × Linear time × Birth orders	Yes	No
Observations	266962	298615
R-squared	0.0037	0.0036

Notes: "Ultrasound **next year**" is an indicator for whether the county gets ultrasound next year to test for pre-trends. Individual controls include mother's ethnicity, education, maternal age at conception and its squared term, gestation length and indicators for the timing of initial prenatal care visits. County fixed effects are separate indicator variables for each county. Year fixed effects are indicators that allow for unrestricted differences in year-to-year changes. Reported in parentheses are standard errors clustered by county. *denotes statistical significance at the 10% level, ** at the 5% level, *** at the 1% level.

Event Study Analysis

- The discrete specification used above provides no sense of the dynamics of ultrasound adoption and sex ratio

$$
\begin{aligned}
\text{Boy}_{ict} &= \phi\, 2\text{nd}^+ + \sum_{\tau=-2}^{5} \delta_\tau D_{ct}^\tau\, 1\text{st} + \sum_{\tau=-2}^{5} \lambda_\tau D_{ct}^\tau\, 2\text{nd}^+ \\
&+ X_{ict}\gamma + \mu_c + \nu_t + \epsilon_{ict}
\end{aligned}
$$

- Augmented with leads and lags of the implied ultrasound adoption
- Allows for anticipatory effects and lagged treatment effects
- Allows these effects to differ between first births and higher order births
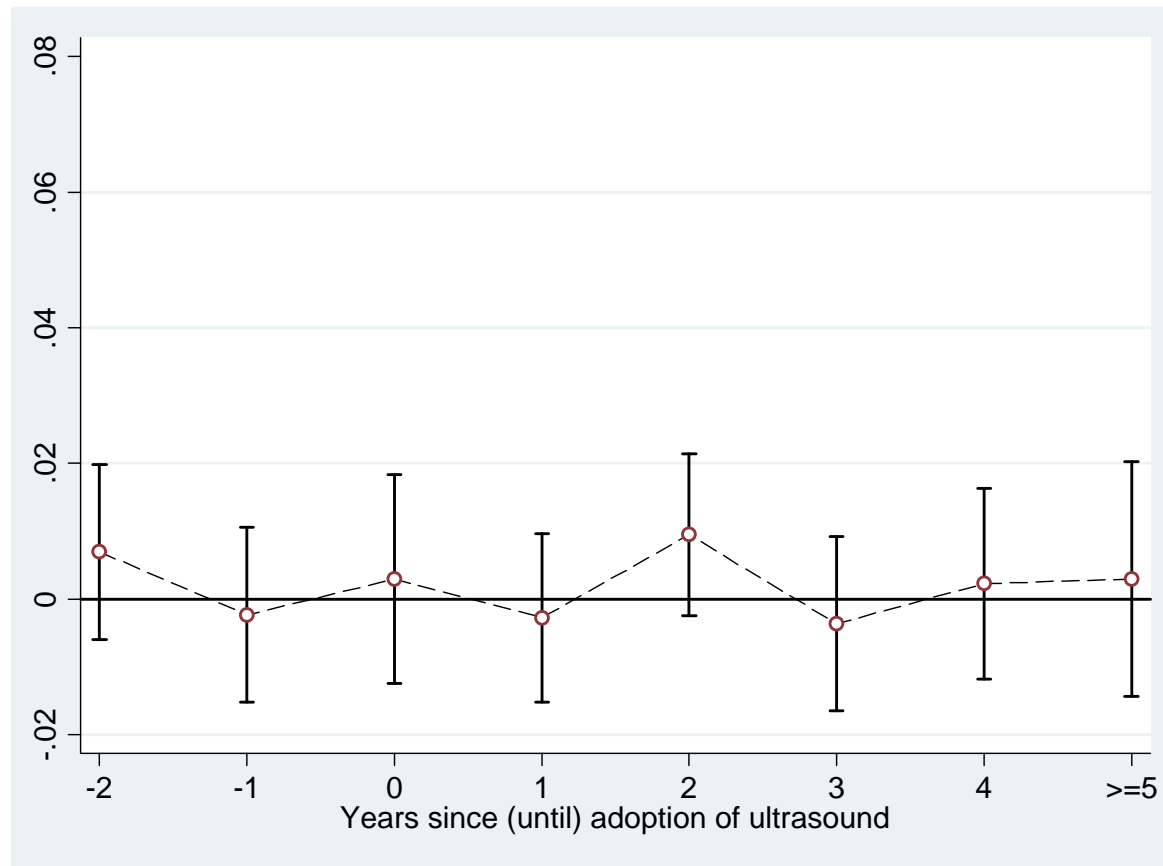
The effects of ultrasound adoption on male prob. of first births

Coefficients of interaction terms of first-birth indicator and dummy variables for years since (until) adoption; vertical bands represent ± 1.96 times the s.e. of each point estimate
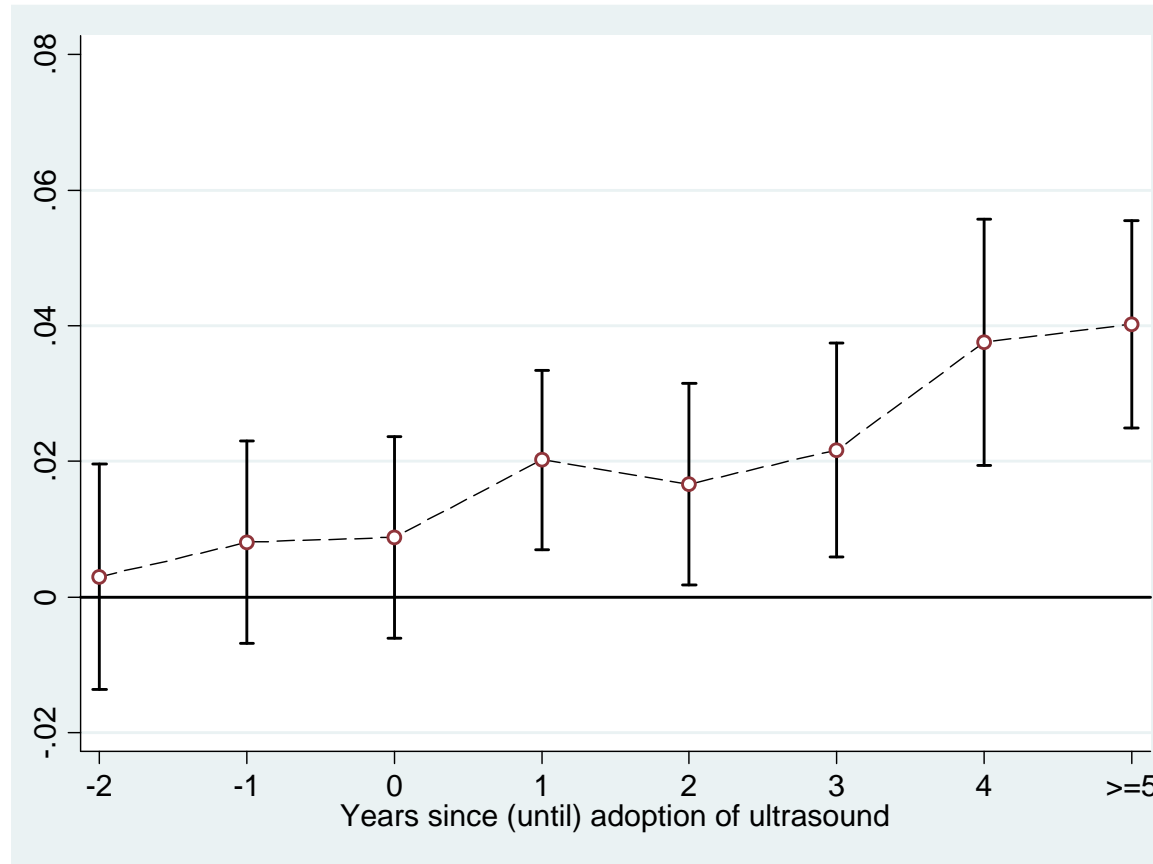
The effects of ultrasound adoption on male prob. of second + births

Coefficients of interaction terms of second-or-higher-order-birth indicator and dummy variables for years since (until) adoption; vertical bands represent ± 1.96 times the s.e. of each point estimate

Table IX : Heterogeneity in Effects of Ultrasound Availability on Male Probability (Births 1975-1992): OLS Results

Dependent var.: child is male

By groups	Residency		Maternal education		Household income	
	Urban	Rural	< median	≥ median	< median	≥ median
	(1)	(2)	(3)	(4)	(5)	(6)
First birth × Ultrasound	0.002	-0.010**	-0.008	-0.006	-0.008	-0.008
	(0.008)	(0.005)	(0.008)	(0.005)	(0.005)	(0.006)
Second birth × Ultrasound	0.022**	0.010**	0.024**	0.008	0.017***	0.009
	(0.010)	(0.005)	(0.010)	(0.005)	(0.006)	(0.007)
Third (or higher order) birth × Ultrasound	0.038**	0.021***	0.040***	0.015*	0.021**	0.027***
	(0.016)	(0.007)	(0.011)	(0.008)	(0.010)	(0.008)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year (of conception) fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	83205	215410	89035	209580	145604	153011
R-squared	0.0066	0.0044	0.0066	0.0040	0.0055	0.0042

Notes: Individual controls include mother's ethnicity, education, maternal age at conception and its squared term, gestation length and indicators for the timing of initial prenatal care visits. County fixed effects are separate indicator variables for each county. Year fixed effects are indicators that allow for unrestricted differences in year-to-year changes. Reported in parentheses are standard errors clustered by county. *denotes statistical significance at the 10% level, ** at the 5% level, *** at the 1% level.

Conclusion

- The current trend in skewed sex ratios at birth in China is significantly influenced by prenatal sex selection

- Moreover, the observed effect of ultrasound on child gender is predominantly a result of prenatal sex selection in areas under tougher enforcement of birth control when the One Child Policy was effective