

Introduction

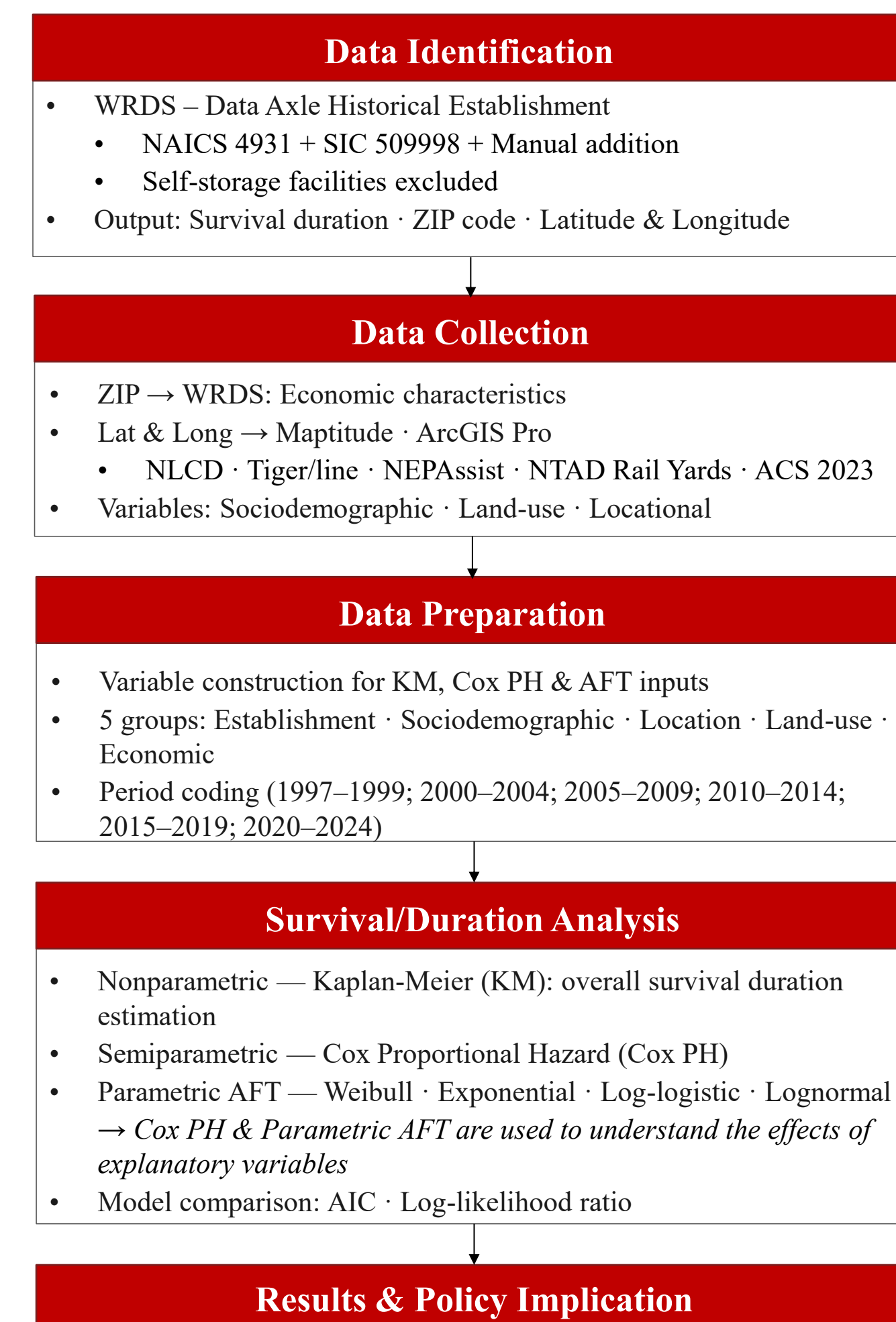
- U.S. business logistics costs total \$2.4 trillion (8.7% of national GDP), with warehouses and distribution centers serving as critical nodes in the supply chain (Kearney & CSCMP, 2024)
- Warehouses and distribution centers serve as the critical origin node for last-mile delivery, which accounts for 41% of total supply chain costs in retail parcel delivery (Capgemini Research Institute, 2019)
- While existing research establishes where logistics facilities are sited and how supply chains are spatially organized, little is known about how long these facilities remain operational and what factors drive their closure or persistence — leaving policymakers without tools to anticipate displacement (Sakai et al., 2020; Rivera-Gonzalez et al., 2023; Pineda-Agudelo et al., 2026)
- Research Objectives:**
 - To estimate the overall survival duration of logistics facilities across U.S. cities
 - To examine the effects of establishment, locational, land-use, and economic factors on the survival time of these facilities

Data & Methodology

Datasets:

- Wharton Research Data Services (WRDS) – Data Axle Historical Establishment
- Multi-Resolution Land Characteristics (MRLC) – National Land Cover Database (NLCD)
- Maptitude – American Community Survey (ACS) 2023
- U.S. Census Bureau – Tiger/line Primary Roads
- U.S. Environmental Protection Agency – NEPassist Airport
- U.S. Department of Transportation – NTAD Rail Yards

Framework:

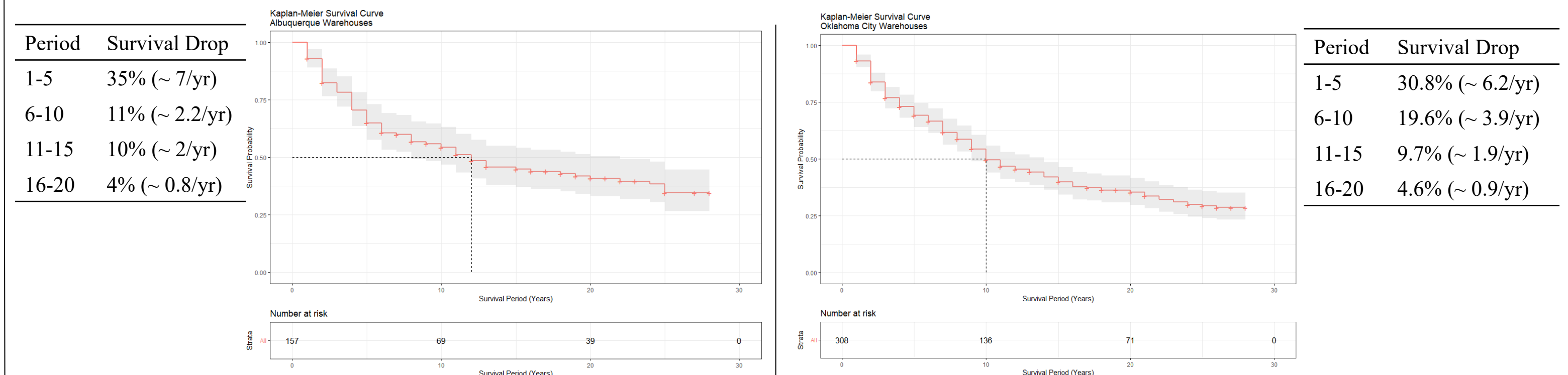


Variables:

Category	Variable
Dependent Variable	Survival duration: number of years the warehouse was active
Establishment Characteristics	Employee size Sales increase Sales decrease Parent affiliation NAICS change
Sociodemographic Characteristics	Population Household income FIS-SIS ratio (employment)
Locational Characteristics	Near primary road Near airport Near railyard Near port
Economic Interaction Variables	% change in FIS × active status % change in SIS × active status
Land Use Interaction Variables	% change in LDD × active status % change in HDD × active status

Preliminary Results

Non-Parametric Model Results (Overall Survival Duration)



Parametric Model Results (Variables' effects)

Model	AIC	Log-likelihood
Cox PH	744.715	-337.357
Exponential	647.241	-287.621
Weibull	640.967	-283.484
Log-logistic	637.300	-281.650
Log-normal	634.881	-280.440

Variable	TR	p-value
naics_change	3.190	9.09e-08 ***
population	0.668	7.67e-05 ***
near_airport	2.058	0.0322 *
int_fis_2000	0.948	0.0016 **
int_sis_2000	1.043	0.0028 **
int_sis_2020	1.028	0.0598 .
int_ldd_2000	1.359	0.0010 **
int_hdd_1997	1.357	0.0092 **

Model	AIC	Log-likelihood
Cox PH	1509.535	-718.768
Exponential	1184.232	-555.116
Weibull	1010.724	-467.362
Log-logistic	1008.768	-466.384
Log-normal	1026.694	-475.347

Variable	TR	p-value
sales_increase	2.021	1.11e-15 ***
sales_decrease	1.952	6.42e-15 ***
naics_change	1.314	6.94e-04 ***
population	0.973	0.0618 .
fis_sis_ratio	0.733	0.0072 **
int_fis_1997	0.981	7.75e-04 ***
int_fis_2000	0.991	0.0092 **
int_fis_2005	0.977	6.29e-05 ***
int_fis_2015	0.983	0.0109 *
int_sis_2000	1.009	0.0024 **
int_sis_2005	1.014	3.55e-04 ***
int_sis_2010	1.022	8.09e-06 ***
int_sis_2020	1.038	3.77e-12 ***
int_hdd_2010	1.092	0.0021 **



Findings and Policy Implications

- 1 in 2 warehouses close within 11 years (ABQ) and 10 years (OKC)
- 1 in 3 facilities close in the critical first 5 years — early-stage support programs targeting new facilities may reduce this concentrated displacement risk
- NAICS industry change is the strongest protective factor (3x longer in ABQ, 1.3x in OKC) — policies reducing barriers to operational adaptation may meaningfully extend facility survival
- Population growth consistently accelerates displacement in both cities — urbanizing areas face heightened displacement risk, warranting targeted land-use protections
- Airport proximity doubles survival in ABQ but shows no effect in OKC — freight infrastructure access should be prioritized in industrial site selection, though benefits appear context-dependent
- Sales activity (increase or decrease) extends survival ~2x in OKC only
- Freight sector (FIS) growth shortens survival (1 period in ABQ, 4 periods in OKC) while service sector (SIS) growth extends survival — balancing both may reduce unintended facility displacement
- Best fit model differs — Lognormal (ABQ) vs Log-logistic (OKC) — suggesting structurally different displacement mechanisms requiring city-specific policy responses