Problem Set #1
Problem 1
Part (a) - (b).

Hamker and Rink (2017) designs a field experiment that tests bureaucratic discrimination of German welfare offices against minority applicants. They send fake requests with varying traits (treatments) to different welfare offices and code their response quality on a 0-5 scale, with higher scores indicating more favorable responses. The authors apply an OLS estimation in their paper, with one dependent variable, five independent treatment variables and three independent contextual variables.

Citation:

Hemker, J., & Rink, A. (2017). Multiple Dimensions of Bureaucratic Discrimination: Evidence from German Welfare Offices. *American Journal of Political Science, 61*(4), 786-803.

Part (c).
The model is:

$$Y_i = \beta_0 + \beta_1 Foreign_i + \beta_2 Female_i + \beta_3 Unskilled_i + \beta_4 Unendorsed_i$$

$$+\beta_5 Informal_i + \beta_6 Unemployment_i + \beta_7 Independent_i + \beta_8 Migrants_i + \epsilon_i$$

where

Y_i represents the outcomes (response quality) of agency i, on a 0-5 scale

$Foreign_i$ (treatment) : the alias (German, Turkish, or Romanian) of the application sent to agency i.

$Female_i$ (treatment) : whether agency i receives an application with a female or male alias,

$Unskilled_i$ (treatment) : whether agency i receives an application from a cleaning person (unskilled) or a physical therapist (skilled),

$Unendorsed_i$ (treatment) : whether agency i receives an application that mentions (support) or does not mention (no support) a lawyer,

$Informal_i$ (treatment) : whether agency i receives an application written in an informal or formal tone,

$Unemployment_i$ (contextual) : the official unemployment rate of agency i's district,

$Independent_i$ (contextual) : whether agency i is independently organized,

$Migrants_i$ (contextual): percentage of citizens with immigration backgrounds in agency i's district according to (Germany) 2011 census,

ϵ_i represents the error term.

Part (d).
In this model, the endogenous variable is Y_i (the outcomes of agency i).
The exogenous variables are $Foreign$, $Female$, $Unskilled$, $Unendorsed$, $Informal$, $Unemployment$, $Independent$, $Migrants$.

Part (e).
This model is static (not time-dependent), linear (with OLS estimation), and stochastic (with an error term).

Part (f).
The model can be improved using hierarchical linear modelling, especially if the authors send invitations to multiple offices in the same district. OLS assumes that variance is constant across all levels, however, in this paper, the variance is constant in both treatment and contextual level alone, but not both levels. To correct that effect, I prefer the model $Y_{ij} = \beta_{0j} + \beta_{1j}(treatment_{ij}) + r_{ij}$, where $\beta_{0j} = \gamma_{00} + \gamma_{01}(district_j) + U_{0j}$, and $\beta_{1j} = \gamma_{10} + \gamma_{11}(district_j) + U_{1j}$.