

Extended Abstract

**A DYNAMIC MODEL FOR ANALYZING
URBAN GROWTH IN A PLANNED CITY**

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This paper will report on ongoing studies of the dynamics of urban growth in Brasília, the capital of Brazil. The study is related to the literature in urban dynamics, but it is centered upon the *transient* dynamics of a *planned* city.¹

Today, only 35 years after its inauguration, Brasília houses a population of almost two million people --nearly twice the number originally estimated by urban planners. The original plans for the city have obviously been replaced by the internal dynamics of growth in the area. No longer is the city's only mission to serve as the federal capital for the nation. The number of federal jobs has been stable for several years while the city's population continues to grow.

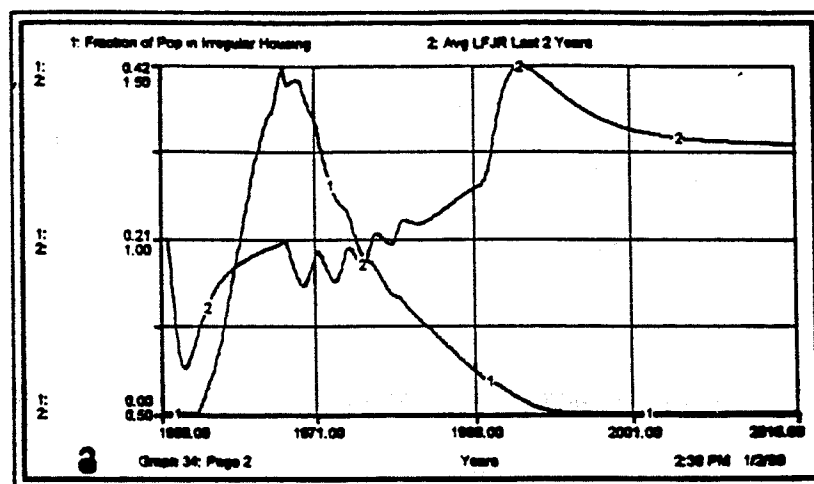
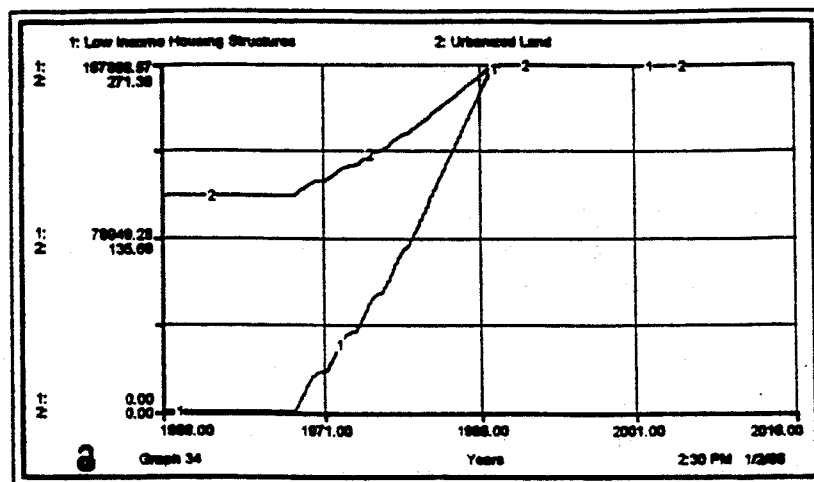
Many "Brasilienses" contend that one of the main causes, or perhaps "The Cause," for the expansion of urbanization has been the political decision to provide permanent housing to people living in irregular settlements, both within and outside the perimeter of the capital. As a result, in 1990, Brasília was surrounded by more than ten satellite-towns which had not been intended by planners. Some of them small and recent, and nearly all composed of mostly low-income people that commute nearly one hour to work in the heart of the city.

A system dynamics model was built to examine this assumption. One of the important aspects which distinguishes this model from traditional studies in urban dynamics is the purposively driven initial growth that results from the *artificially* created effort. In addition to the three sectors identified in most models --*Business, Housing* and *Population*-- this one portrays two additional sectors: *Government* and *Urbanized Land*. Finally, the model also simulates the pool of *construction jobs/workers*, separately from ordinary jobs.

(A sector diagram is attached to this abstract.)

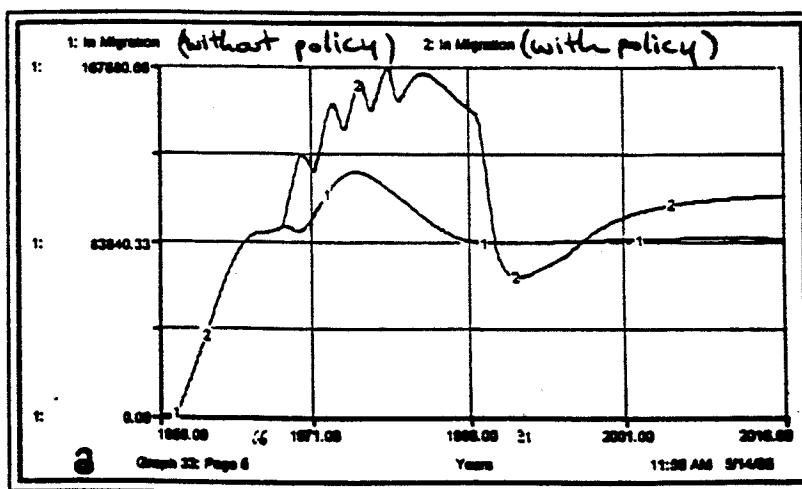
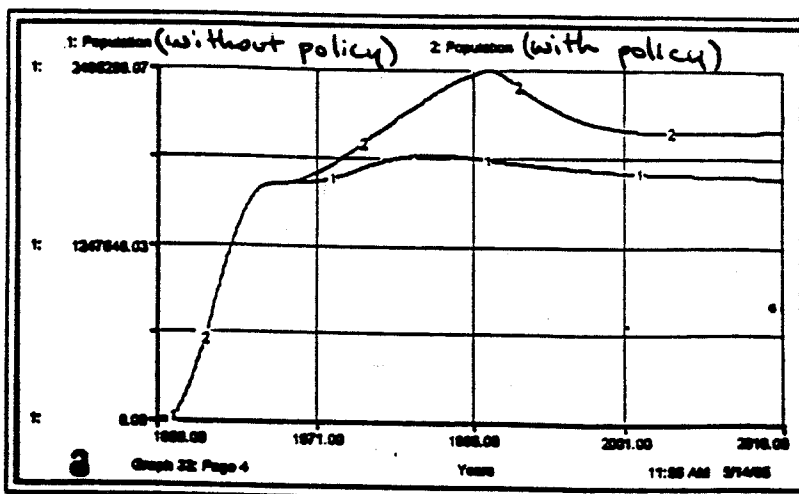
¹The author wishes to acknowledge the on-going support and advice of Professors George P. Richardson and David F. Andersen, as well as of his system dynamics' colleagues at the University at Albany.

The model suggests that the low-income housing policy alone cannot be the sole cause of continuous urbanization. Considered by itself, in the model, urbanization related to the low income housing policy stops some time after unemployment becomes a permanent condition in the city. According to the model, the main deterrent to the expansion of irregular housing is not the fact that the local government subsidized housing for low income groups, but rather, unfavorable changes in the employment conditions of the city --*Labor Force to Jobs Ratio (LFJR)*.



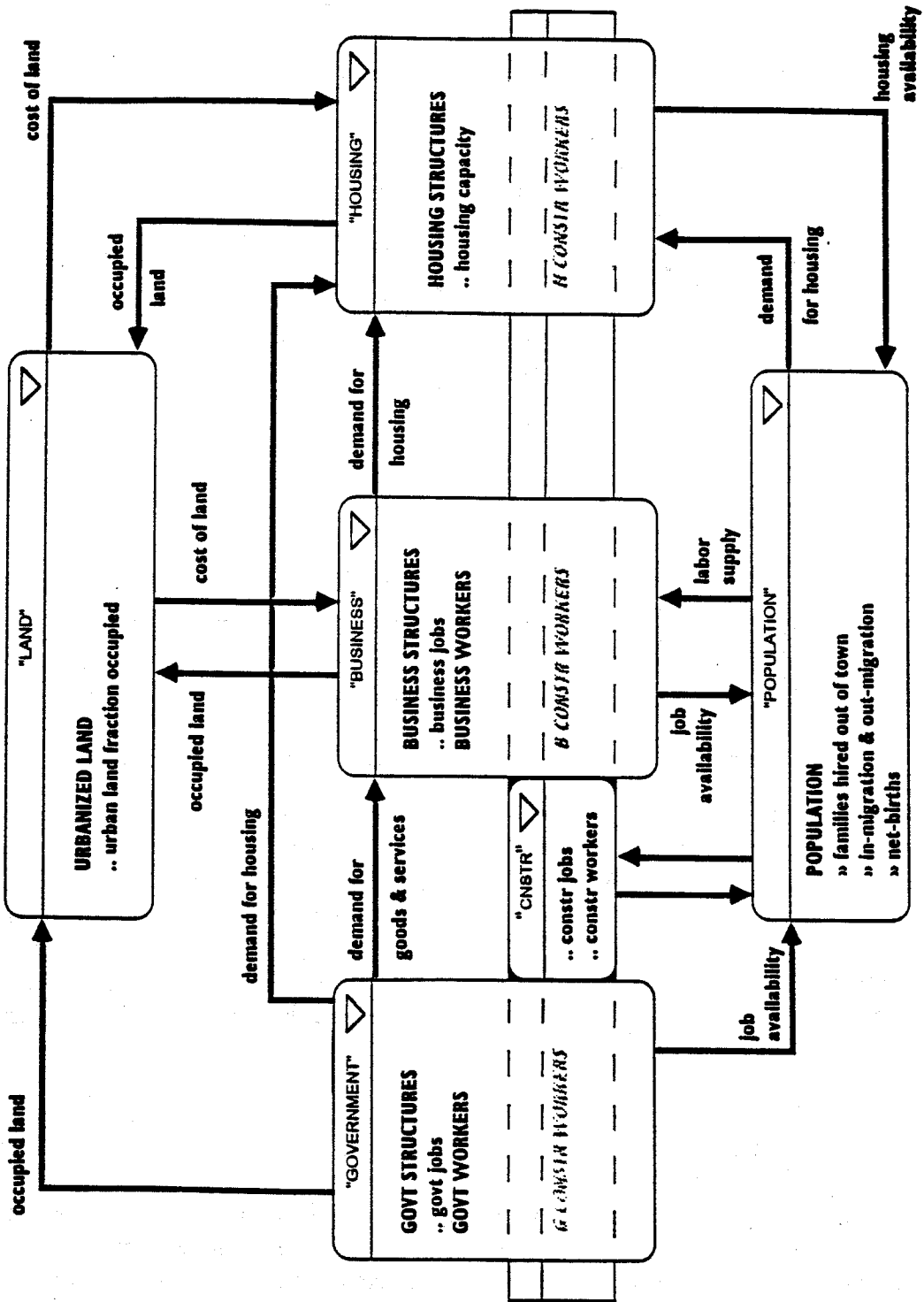
Only for so long as the city's employment conditions are more favorable than those of other urban centers, or of rural areas, would irregular housing in Brasília continue to expand.

Nevertheless, the existence of widespread irregular housing conditions shortly after the conclusion of the construction of the main government structures --when unemployment conditions surfaced because of laid-off construction workers-- did serve as a major incentive to spur urban growth in the new capital beyond what planners had envisioned.



As opponents of the low-income housing policy have argued, the model seems to confirm that already unfavorable socio-economic conditions were aggravated with the adoption of the policy. The policy was effective in terms of bringing housing density to normal levels, but the improvements achieved in terms of housing conditions came at the expense of employment conditions. Furthermore, because of the way the policy was implemented -- with the construction of subsidized housing occurring outside the city-- social inequalities may have been institutionalized with the well-off living in the inner-perimeter, and the poor living in the satellite towns.

This source of pressure for urbanization, however, was soon exhausted. Alternative or complementary reasons for the current growth observed in the city today must be found. In addition to identifying other pressures towards urbanization in Brasília, future research should also consider what policies might be adopted to reverse this situation. Finally, the long-term objective of this research is to develop an understanding about the internal dynamics of urban growth in planned cities, and to arrive at a generic model.



620