Chapters Three and Four describe several reasons for the mismatch between ECI’s expected and actual costs per child. These include underestimates of administrative and capital costs, a change in the service mix to full-day, center-based services, and a failure to account for the fact that per-child costs are higher at centers that are not fully enrolled (i.e., most operational costs at centers are largely fixed). Here we return to the cost issue to examine the relative magnitudes of different reasons for the underestimation of costs.

We examine the issue in several ways. First, we separate planned and actual costs into central administration, capital, and neighborhood/operating costs, showing the proportional difference in each category. Next, we examine how the picture changes when costs are examined in terms of child-hours of service rather than child-years of service. The bulk of the chapter then examines the results of two simulations that estimate what ECI’s expected costs would have been if two key assumptions of the business plan—related to the service mix and the fixed costs of new centers—had accurately reflected the ultimate reality.

**EXPECTED AND ACTUAL COSTS BY COMPONENT**

Consider the proportional difference between actual and expected costs for the categories of central administration, capital, and neighborhood/operating costs. Total cost per child in 1999 ($13,612) was 3.1 times as high as expected cost ($4,407). Table 5.1 shows the proportional and dollar increases for these three components of total costs.
Table 5.1
Difference Between Expected and Actual Costs, 1999

<table>
<thead>
<tr>
<th>Component</th>
<th>Expected Cost per Child</th>
<th>Actual Cost per Child</th>
<th>Difference</th>
<th>Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central administration</td>
<td>286</td>
<td>1,231</td>
<td>946</td>
<td>4.3</td>
</tr>
<tr>
<td>Capital</td>
<td>155</td>
<td>697</td>
<td>542</td>
<td>4.5</td>
</tr>
<tr>
<td>Neighborhood/operating</td>
<td>3,966</td>
<td>11,684</td>
<td>7,717</td>
<td>2.9</td>
</tr>
<tr>
<td>Total</td>
<td>4,407</td>
<td>13,612</td>
<td>9,205</td>
<td>3.1</td>
</tr>
</tbody>
</table>

By this measure, all categories of expenses were dramatically higher than expected. This table does not consider the effect of the service mix, however, which had major implications for both capital and neighborhood/operating costs.

COST PER CHILD-HOUR

As noted in Chapter Four, the change in the service mix was one prominent reason that costs were higher than expected. ECI was providing more hours of service per child than planned, because virtually all children in the program were in full-day services rather than in the part-day services the business plan had expected to predominate. Neighborhood agency representatives understood this point quite well. In our interviews, they argued that cost comparisons should account for the greater number of hours of service being provided to each child. According to our interviewees, the typical child was in fact in service for 10 hours per day. When considered on an hourly basis, implicitly adjusting for the intensity of the services, ECI’s expected cost of $3.02 per child-hour compares to an actual cost of $5.24 per child-hour.\(^1\) While the difference between expected and actual cost per child-hour is much smaller proportionally than the difference between expected and actual cost per child-year, it remains substantial.

Whether annual or hourly cost is the more appropriate measure depends on the comparative net social benefits of part-day versus full-

\(^1\)If the average length of service was less than 10 hours daily, true cost would be somewhat higher than $5.24.
day ECE programs. Unfortunately, no research exists to answer this question definitively. In terms of care, presumably a full-day program (notionally 10 hours) produces about three times the benefit of a part-day program (notionally 3.5 hours), and cost per hour is the appropriate measure. But in terms of education, it is not clear that the benefit scales linearly with the number of contact hours. For example, a three-year-old child may derive a substantial educational benefit from three hours of education daily, but hours four through 10 may provide only a small additional educational benefit. However, it is also possible that a substantial educational benefit is realized only above a threshold number of hours per service. None of the existing research on the benefits of high-quality ECE can answer these questions and identify the marginal benefit of additional hours of care. It should be noted, however, that Perry Preschool, the most frequently cited example of a high-quality ECE program with demonstrated long-term benefits, operated on a part-day basis.

When ECI was launched, its business plan focused on the number of children to be served, not the number of hours of service to be provided. Our interviews confirm that most of ECI’s stakeholders saw ECI’s goal as serving a large number of children, independent of the number of hours of service. For those stakeholders and in ECI’s own terms, cost per child-year is likely to be a better measure than cost per child-hour. We therefore focused most of our analysis on the cost per child-year. Nevertheless, we believe that it is important to account for the service mix as a key explanation for ECI’s costs, and our adjustment for the service mix implicitly accounts for the increased number of hours of service provided.

**ADJUSTING FOR SERVICE MIX**

As noted in Chapter Four, the shift from 71 percent part-time service (in the plan) to 100 percent full-time (and largely center-based) programs (in actuality) would have driven the cost per child up from $4,407 to $7,961 even if all the business plan’s assumptions about the costs of specific kinds of care had been correct. Figure 5.1 breaks out the costs of capital, central administration, and neighborhood-level operating expenses. The first bar in the figure describes costs projected in the original business plan; the third bar shows costs actually incurred by ECI. The second bar illustrates the simulated result
based on the original business plan’s assumptions with respect to component costs: Administrative cost per child is independent of service mix, but operating and capital costs vary for different kinds of services. If ECI had correctly estimated the actual service mix in advance, its own assumptions about the costs of specific services would have led to the predicted costs shown in the second bar of Figure 5.1, for a total of $7,961, not $4,407. (Detailed tables can be found in the Appendix.)

More specifically, the change in service mix by itself would have raised capital costs from $155 to $642 per child and neighborhood/operating costs from $3,966 to $7,033 per child. In sum, the service mix explains nearly all of the increase in capital costs and a substantial part of the increase in operating costs. The difference between the simulated result of $7,961 and the actual cost of $13,612 must be explained by factors other than the service mix.

**ADJUSTING FOR FIXED COSTS**

In addition to its mistaken assumption about service mix, the cost analysis in the original plan contained the erroneous assumption...
that all operating costs at centers would be completely variable. As a result, the operating cost per child served by a center was projected to be the same (what it would be at full enrollment) regardless of the number of children enrolled. In reality, ECI centers’ operating costs were mostly fixed, as we describe in Chapter Four: Staff had to be hired before opening, and salaries had to be paid even if a center was not filled to capacity. Moreover, requirements about group sizes and staff-to-child ratios further constrained providers’ ability to vary their operating costs with enrollment. If the business plan had recognized that the operating costs of centers were largely fixed, it would have predicted a much more conservative (i.e., higher) estimate of the cost per child, especially during the scale-up period, when new centers were opening and their enrollments were increasing gradually.

We can estimate the magnitude of the effect of less-than-100-percent enrollment on the cost per child-year by adjusting initial estimates of cost with a factor that accounts for actual enrollment rates. This estimate is subject to some uncertainty because the data were incomplete and a number of assumptions were required. Moreover, the adjustment is likely to be somewhat inflated because it assumes that all costs in child-care centers are fixed despite the fact that some costs are likely to vary with enrollment. For example, centers that are less than fully enrolled will use fewer disposable supplies (e.g., crayons and books) than will fully enrolled centers. We believe that these variable costs are likely to be relatively small. Nevertheless, it should be recognized that this adjustment produces an upper-bound estimate of the cost per child. (From a business planning perspective, such an adjustment might be considered prudently conservative.)

We estimate that ECI centers were enrolled at an average rate of 72.6 percent of capacity in 1999 (with the enrollment rate gradually increasing over the course of the year). If ECI’s planners had assumed that operating costs in centers were fixed (and if they had accurately estimated a 72.6 percent enrollment rate in 1999), they would have inflated their estimates of the per-child operating cost of center-based service by dividing by 0.726.

2In particular, data were incomplete with respect to both ECI capacity and enrollment. The data limitations and the assumptions made to surmount them are described in the Appendix.
Figure 5.2 adds a new bar to Figure 5.1 to show the results of applying this adjustment to the previous adjustment for the service mix. As can be seen, if the business plan had both anticipated the actual service mix and accounted for fixed operating costs in centers, it would have predicted ECI’s cost per child to be as high as $10,373 (including $9,445 in neighborhood/operating cost) rather than the $4,407 actually predicted. To reiterate, the estimate of $10,373 is probably somewhat high because it assumes that all center-based operating costs are fixed even though centers can in fact probably save a limited amount of money when enrollment is below capacity. It should be considered an upper-bound figure that provides a rough estimate of the additional costs that are explained by the predictable fixed costs of operating child-care centers.

**SUMMARY OF COST FACTORS**

With the aid of the simulations that adjust for both service mix and fixed operating costs in child-care centers, we can re-examine the relative differences between simulated and actual costs for adminis-
trative, capital, and neighborhood/operating expenses. Table 5.2 replicates Table 5.1, except that a column showing the simulated cost with the service-mix and fixed-cost corrections replaces the estimated costs from the original business plan. Table 5.2 thus compares the actual cost in each category of expenditure with the cost that would have been expected had the original business plan accounted for the actual service mix and the fixed operating costs of child-care centers.

The simulations do not affect the results for administrative costs, which should be largely unaffected by service mix and entirely unaffected by the fixed-cost adjustment to center-based operating costs. As noted previously, the service mix adjustment dramatically increased simulated capital costs; as a result, actual capital costs were only 9 percent higher than simulated capital costs. Both adjustments raise expected neighborhood/operating costs substantially. Actual neighborhood/operating costs remain higher than the simulated prediction, but only by 24 percent. Total cost per child exceeds the simulated cost by 31 percent, which is dramatically less than the 211 percent by which total cost exceeds the business plan’s original estimate. These results strongly suggest that the business plan’s flawed assumptions about service mix and fixed costs account for a large proportion of ECI’s cost overrun.

We can estimate the relative significance of the service-mix and fixed-cost adjustments alongside remaining capital, administrative, and neighborhood/operating costs in explaining the total difference between ECI’s planned ($4,407) and actual ($13,612) cost per child.

### Table 5.2

<table>
<thead>
<tr>
<th>Component</th>
<th>Simulated Cost per Child with Service-Mix and Fixed-Cost Adjustments</th>
<th>Actual Cost per Child</th>
<th>Difference</th>
<th>Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central administration</td>
<td>286</td>
<td>1,231</td>
<td>946</td>
<td>4.30</td>
</tr>
<tr>
<td>Capital</td>
<td>642</td>
<td>697</td>
<td>55</td>
<td>1.09</td>
</tr>
<tr>
<td>Neighborhood/operating</td>
<td>9,445</td>
<td>11,684</td>
<td>2,238</td>
<td>1.24</td>
</tr>
<tr>
<td>Total</td>
<td>10,373</td>
<td>13,612</td>
<td>3,239</td>
<td>1.31</td>
</tr>
</tbody>
</table>
In total, the difference between estimated and actual cost per child is $13,612 minus $4,407, or $9,205. The mistaken assumptions about service mix and variable costs together explain as much as 65 percent of this difference.\(^3\) It is not possible to cleanly separate the effects of these two assumptions, however, because they interact with each other. We therefore lump them together here as “business plan assumptions that proved false.” As in the preceding analysis, this represents an upper-bound estimate because some center-based operating costs may be variable rather than fixed. Figure 5.3 shows how central administrative costs and additional operating and capital costs (not already explained by the service mix) compare to the flawed business plan assumptions in explaining the total difference between planned and expected cost per child.

The importance of capital costs is explained almost entirely by the service mix. Capital costs were substantially higher than expected in total, but this was largely because a higher proportion of children than expected were served in new child-care centers. Additional capital costs, beyond those predicted by the service mix, explain less than 1 percent of the difference between actual and expected costs.

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\(^3\)The difference between $10,373 (simulated) and $4,407 (actual) is $5,966, which is 65 percent of the total difference, $9,205.
Administrative costs were far higher than expected. Nevertheless, their magnitude is small when compared to the combined effect of the service-mix and fixed-cost corrections. Administrative costs explain 10 percent of the total difference between actual and planned cost per child. As we argue in Chapter Three, however, ECI’s theory of action required substantial administrative costs, probably far in excess of those that were budgeted. Arguably, then, the excess administrative cost could be added to the “business plan assumptions that proved false.”

After we account for underestimates related to service mix, fixed operating costs, capital costs, and central administrative costs of ECIM and UW, the remaining neighborhood-level costs for lead agencies and service provision explain perhaps 24 percent of the difference between expected and actual cost per child (which may be a slight underestimate if the fixed cost adjustment is overestimated).

Unfortunately, we do not have sufficient data to break the neighborhood/operating costs down further. It is likely that some of these were additional administrative costs incurred by lead agencies as they hired the supervisory staff required by ECI. We have no indication that lead agencies were wasteful in their use of resources, but ECI’s theory of action required the creation of an administrative structure at the lead agency level as well as at the central level. It seems likely that the business plan underestimated this expense as well as the central administrative expense. The costs of lead agency administrative staff were likely to be especially important when many lead agencies enrolled relatively small numbers of children.

CONCLUSION

The interpretation of ECI’s total cost of $13,612 per child depends to a great extent on the frame of reference. Compared to the budgeted amount of $4,407, it seems astonishingly high. But it is important to remember that high-quality, full-day ECE programs generally cost substantially more than $4,407. Two of Pittsburgh’s most prominent full-day ECE programs, each of which has a strong reputation for quality, range in cost from $8,500 to $9,200 per child per year (including operating and capital costs). Moreover, these programs do not need to incur quality monitoring costs; they have no central
administration or lead agency to support. Minus the cost of central administration, ECI’s costs amounted to $11,916, which still includes lead agency administrative costs. If all administrative costs could be separately accounted for, ECI’s cost of actual service delivery might be comparable to that of other high-quality, full-day ECE programs.

Nevertheless, it is clear that ECI’s business plan and operation ensured that costs would be dramatically higher than expected. The theory of action virtually guaranteed that administrative costs would be high. In addition, planners failed to anticipate the predictable demands of parents and lead agencies, which moved the initiative toward providing the more-costly, full-time, center-based care. Indeed, ECI ultimately looked quite different than many of its original advocates and funders had intended. And the difference between planned and actual cost had important implications for ECI’s long-term viability, a topic to which we turn in the next chapter.