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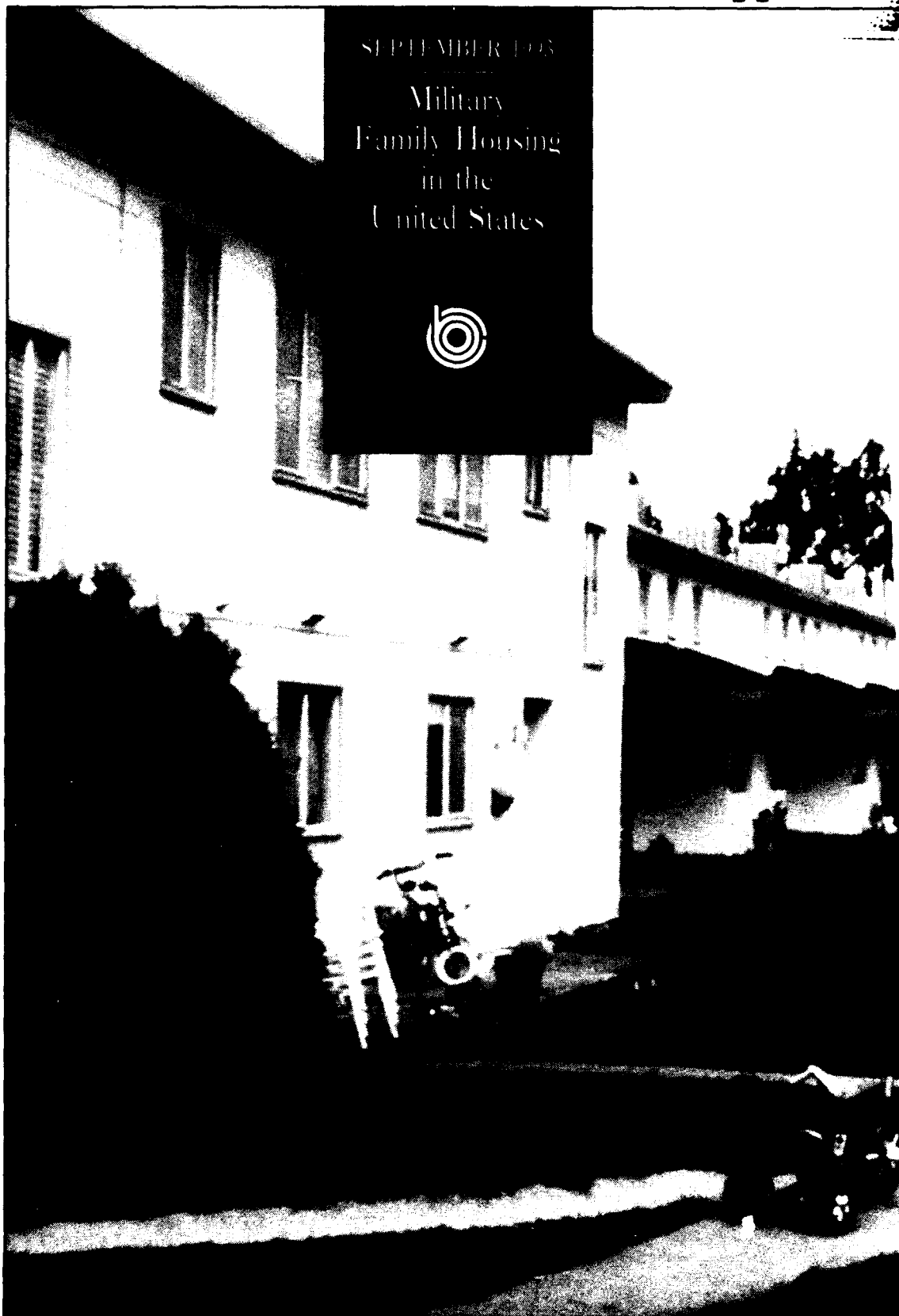
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SEPTEMBER 1993
Military
Family Housing
in the
United States



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MILITARY FAMILY HOUSING IN THE UNITED STATES

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NOTES

Numbers in the text and tables of this report may not add to totals because of rounding.

Unless otherwise indicated, all dollar amounts are in 1993 dollars.

Cover photo shows family housing for enlisted personnel at Travis Air Force Base in Fairfield, California. (U.S. Air Force photo)

Preface

With the end of the Cold War and the decline in resources for national defense, the Department of Defense (DoD) has reduced both its purchases of new weapons and the number of combat units it maintains. But the department has not always proportionally reduced the size and cost of the infrastructure that supports its equipment and personnel.

One element of that infrastructure is DoD family housing in the United States: the government-owned or government-leased housing that DoD provides to the families of many military personnel in lieu of cash housing allowances. In part because the military services value such housing as a way to ensure an adequate quality of life for their members, DoD's housing inventory remains near its Cold War level. A declining defense budget, however, raises certain questions. Can DoD increase the contribution that its housing makes to the welfare of military families without also increasing expenditures? Are there less costly alternatives that would maintain the current quality of life of military families in the post-Cold War environment?

This study was prepared in response to a joint request by the Chairman of the Military Personnel and Compensation Subcommittee (now known as the Military Forces and Personnel Subcommittee) and the Chairman of the Subcommittee on Military Installations and Facilities of the House Armed Services Committee. It examines policy options that would reduce the cost of DoD family housing in the United States while attempting to protect the quality of life now enjoyed by the families of military personnel. In keeping with the mandate of the Congressional Budget Office (CBO) to provide objective analysis, the study contains no recommendations.

Deborah Clay-Mendez of CBO's National Security Division and Lisa Siegel of CBO's Budget Analysis Division prepared the study under the general supervision of Robert F. Hale, Neil M. Singer, and Michael A. Miller. Drafts of the study benefited from insightful reviews by Frank Camm of the RAND Corporation. The authors gratefully acknowledge the useful comments provided by their CBO colleagues Ivan Eland and Carla Pedone, as well as the valuable assistance of Eugene Bryton, Fritz M. Maier, Jon Berg, Marty Felsenthal, and Karen Watkins. The authors would also like to thank the numerous DoD officials who responded to their questions and requests for data.

Leah Mazade edited the manuscript, and Christian Spoor provided editorial assistance. Judith Cromwell produced the many drafts, and Martina Wojak-Piotrow, with the assistance of Kathryn Quattrone, prepared the report for publication.

Robert D. Reischauer
Director

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Summary

The Department of Defense (DoD) relies on a combination of private-sector housing and government-owned or government-leased housing to ensure that the families of military personnel have access to adequate, affordable living quarters. Approximately two-thirds of the 900,000 military families living in the United States receive cash housing allowances that they use to rent or purchase housing in the private sector in communities near their military installations. The remaining one-third forfeit their cash allowances, and DoD assigns them to houses or apartments that it provides. DoD currently owns or leases more than 300,000 units of family housing in the United States, located mostly on military installations. The Defense Department spends approximately \$7 billion each year on housing allowances and its family housing for military families in the United States. Although military families that live outside of the United States also receive housing benefits, this study focuses on the issues that face DoD's system of family housing in the United States, where more than three-quarters of all military families and DoD housing is located.

DoD's stated policy is to rely on its own housing only when the private sector is unable to provide adequate, affordable housing or when personnel must be housed on-base to ensure military readiness. That policy appears to be a cost-effective one. Indeed, the cost over the long run of the DoD housing provided to members of the armed services is, on average, approximately 35 percent greater than the

cost of the private-sector housing that is chosen by comparable military families in the same locations.

It appears, however, that DoD does not rigorously enforce its policy. Most DoD family housing units are not located in high-cost or isolated areas where it might be difficult to obtain housing in the private sector. Moreover, DoD's plans call for the proportion of military families who live in its housing, already at a historically high level, to grow even larger as the size of the armed forces decreases.

A number of factors contribute to DoD's reliance on its family housing. One is an implicit price subsidy that encourages families to seek DoD housing instead of housing in the private sector. Military families who live in the private sector typically spend 20 percent more on housing than they receive in housing allowances. That out-of-pocket cost is sometimes viewed as an indication of the degree to which the current system distorts the financial incentives that military personnel face in choosing between DoD and private-sector housing. In fact, as this study indicates, the current system distorts the relative prices of DoD and private-sector housing by much more than 20 percent. Military families who live in the private sector pay a price that covers the full cost of their housing. But military families who live in DoD housing forfeit a housing allowance that is equal, on average, to only 60 percent of the cost that the federal government incurs in providing their housing. In effect, the forgone housing allowance is the

"price" that the service member pays for DoD housing. The 40 percent difference between that price and the cost of the housing is a price subsidy that encourages service members to use DoD housing.

Even without the financial incentive, however, other factors could make it difficult for DoD to enforce its stated policy of relying on housing in the private sector. Many military families prefer to live on-base, where they benefit from a sense of community and easier access to on-base recreational, medical, and shopping services. Some of those families might seek DoD housing even if they had to pay its full cost. In addition, some military leaders feel that the military-centered lifestyle possible in on-base communities is itself a valuable asset that should be encouraged.

During the next few years, DoD and the Congress will face some important decisions about the military's future role in providing family housing in the United States. Most of DoD's existing stock of housing was built during the early years of the Cold War, when a nationwide housing shortage existed and DoD first confronted the task of supporting a large standing army subject to frequent tours of duty overseas. Those housing units are now reaching the end of their service lives, and DoD estimates that its unfunded backlog of needed revitalization and replacement projects for those units totals approximately \$11 billion. The decisions that DoD must make in the near term about the housing it provides will have important effects on the costs of its family housing program and the quality of military life.

DoD's Plans for Family Housing in the United States

DoD housing officials place a high priority on continuing to operate and maintain the exist-

ing stock of DoD housing in the United States, although the department foresees some reductions in inventories as a result of base closures. The data currently available to the Congressional Budget Office (CBO) indicate that DoD plans to own or lease approximately 298,000 U.S. housing units in 1999--a reduction of only 4 percent relative to 1990. (In this study, DoD's plan for its family housing system for 1994 reflects the 1994 budget of the Clinton Administration. DoD's plans for 1995 through 1999 are based on figures released by the Bush Administration in January 1993.)

Rather than remove existing units from the DoD inventory as the number of military families in the United States falls, DoD plans to maintain its housing stock and accommodate a larger percentage of families. CBO estimates that the percentage of military families living in DoD housing in the United States, which rose from 30 percent to an estimated 33 percent between 1991 and 1993, could rise to 38 percent by 1999. That estimate assumes that 1.2 million of the 1.4 million active-duty military personnel in the Clinton Administration's planned force will be stationed in the United States.

The Defense Department's plan to increase the percentage of families living in its housing offers some advantages. For example, it would improve the overall quality of life for military families in the United States because currently there are not enough DoD housing units to accommodate all of the families who would like to live on-base. The families of junior enlisted personnel, who have traditionally been the last to gain access to DoD housing, would be among those who are most likely to benefit.

Because of the aging of the existing housing stock, however, this plan could prove expensive. CBO estimates that between 1994 and 1999, DoD would have to spend, on average, \$880 million annually on projects to revitalize or replace units in order to keep the backlog of such requirements from growing still further. That estimate does not include the cost of re-

ducing the existing backlog, constructing additions to the housing stock in the United States, or revitalizing or replacing DoD housing overseas.

CBO's estimate of the annual funding required for revitalizing and replacing units between 1994 and 1999 is significantly greater than the current levels of funding. The Congress appropriated approximately \$480 million for such construction in the United States during 1993, and the Clinton Administration's 1994 budget requests approximately \$500 million for that purpose. In a period of limited defense spending, it is not clear whether additional funding will be available. Yet without it, the overall quality of DoD family housing is likely to decline.

This study examines five alternatives to the DoD plan that attempt to reduce the total cost of family housing—including the cost of housing allowances—and still maintain the quality of life now enjoyed by military families. The first two alternatives focus on the supply of DoD housing: they would hold down costs by reducing DoD's planned inventories and thus increase the military's reliance on housing in the private sector, which is generally cheaper. The final three alternatives focus on the demand for DoD housing. They attempt to reduce costs and DoD inventories by altering the incentives that encourage military families to seek DoD rather than private-sector housing.

Alternative Inventory Plans

The first alternative inventory plan proposes a relatively modest reduction in DoD housing inventories between 1994 and 1999, with no change in inventories after that time. The second alternative calls for a greater reduction in inventories between 1994 and 1999 as the first step in a long-run plan that significantly reduces DoD's role in family housing.

Option 1: Maintain the Current Percentage of Families in DoD Housing

Under the first alternative, DoD would retire enough aging units so that the percentage of families living in DoD housing in 1999 would remain at the 1993 level of 33 percent instead of rising to 38 percent, as it would in the DoD plan. This option uses the post-Cold War reduction of the armed forces as an opportunity to decrease DoD housing inventories, and thus costs, yet still maintain the current rate of access to DoD family housing for those who remain in the force.

To hold constant the percentage of families in its housing, DoD would cut back its planned housing inventory by 15 percent, or 46,000 units, between 1994 and 1999. By deleting aging units from its inventory, DoD would reduce the level of funding required for revitalization. Because of the incentives that encourage DoD to maintain its existing stock of housing, the Congress might need to legislate a ceiling on the number of DoD-owned units to ensure that the department actually reduces its inventory.

The savings to the federal government under this option over the 1994-1999 period would average \$470 million a year relative to the cost of a fully funded DoD plan (see Summary Table 1). That estimate assumes that aging units that otherwise would be revitalized are retired instead. Savings would be greater if DoD decreased its inventory by reducing its construction of new or replacement units.

Although annual savings during this period would be especially large because of the avoided revitalization costs, this option would also offer savings in the long run. From that perspective, the option can be viewed as offering a perpetual stream of savings of \$190 million a year. (That figure represents the value of all future savings expressed in annual terms us-

ing a 3 percent discount rate to take into account the value of money over time.) All of the above estimates take into account the cost of the housing allowances paid to the families who would be forced to live in private-sector housing rather than on-base.

This alternative not only offers the potential for savings but is also more consistent than the DoD plan with the department's stated policy of relying on the private sector for housing. Despite DoD's policy, there has been a gradual, long-term trend toward greater

Summary Table 1.
Alternatives to the DoD Plan for Its Family Housing System in the United States

Alternative	Savings ^a (Millions of 1993 dollars)		Number of DoD-Owned Units (Thousands)		Key Features
	Annual Average, 1994-1999	Long- Term Annualized ^b	In 1999	Over the Long Term	
DoD Plan	n.a.	n.a.	283	283	Increases access to DoD housing
Options That Reduce Inventory					
1. Maintain Current Percentage of Families in DoD Housing	470	190	237	237	Avoids further reliance on DoD housing without harming the quality of military life
2. Enforce Reliance on the Private Sector ^c	690	450	222	71	Relies on the private sector and improves quality of life for most military families
Options That Reduce Demand					
3. Raise Allowances and Cut Basic Pay	d	d	e	e	Encourages voluntary shift to private-sector housing
4. Reallocate Allowances from Low-Cost to High-Cost Areas	d	d	e	e	Reduces construction requirements in high-cost areas
5. Institute a Rental Market Within DoD ^c	760	480	222	71	Permits preferences of service members to determine the mix of DoD and private-sector housing

SOURCE: Congressional Budget Office based on Department of Defense data.

NOTES: DoD = Department of Defense; n.a. = not applicable.

- Numbers in these columns represent savings to the federal government relative to a fully funded DoD plan.
- Total savings expressed as a constant annual stream with the same present discounted value. A 3 percent annual discount rate was used to take into account the value of money over time.
- Assumes 25 percent of existing units are retained in the long run.
- Savings under this option are uncertain; they depend on the extent to which the demand for DoD units responds to changes in allowance levels and on the extent to which reductions in the demand for units lead, in the long run, to smaller DoD inventories and decreases in accompanying costs.
- Although some reductions in inventories are expected under this option, their magnitude is uncertain.

reliance on DoD housing since the beginning of the Cold War. That broad trend, which might be overlooked during annual budget reviews that focus on requests for construction at individual installations, could be halted by a legislated cap on the total number of DoD housing units or on the percentage of military families who can live in DoD housing.

The principal disadvantage of this alternative is that the quality of life of some military families would be impaired, compared with the DoD plan. Under this option, some military families who wanted to live in DoD housing and who would have been able to do so under the DoD plan would be forced to live in private-sector housing. That outcome could be a particular concern for junior enlisted personnel, who are currently among the last to gain access to DoD housing.

Option 2: Enforce Reliance on the Private Sector

This alternative would also reduce DoD's costs for revitalization by retiring aging units. The objective in this case, however, would be not just to maintain the current percentage of families in DoD housing but to reduce that percentage by enforcing the department's stated policy of relying on housing in the private sector. The end of the Cold War has reduced the need for frequent overseas rotations by military personnel, raising the possibility of longer tours of duty in the United States. As a result, DoD may find it appropriate to reconsider its role as a provider of family housing and to encourage a military life-style that is better integrated with the civilian community.

Under this alternative, DoD would conduct annual screenings of units reaching the age at which they would need to be revitalized or replaced, retaining only those that met stringent criteria. For example, DoD would continue to maintain units in isolated locations or in locations in which restrictive zoning ordinances or rent control hampered the ability of the private market to meet the housing needs

of military personnel. Again, to carry out this alternative effectively, the Congress might have to legislate ceilings on the number of DoD units over time. To mitigate the impact of this approach on the average quality of life enjoyed by military families, DoD would increase the rates of its housing allowances so that the total out-of-pocket costs incurred by service members would not rise as the number of families living in the private sector increased.

Savings from the option would depend on the extent to which revitalizing or replacing existing inventories proved justified under the screening process. Most DoD family housing units are not in high-cost or isolated areas; thus, DoD could arguably retire a significant percentage of its aging housing stock. Nonetheless, DoD must keep some of its existing units to meet the needs of personnel who have military responsibilities that require them to live on-base or who live in locations in which adequate housing is unavailable in the private sector. CBO's estimates of the costs for this alternative assume that 25 percent of the units screened each year would be revitalized or replaced in order to meet these needs.

Under that assumption, DoD inventories would decline gradually over a 35-year period until they reached 25 percent of the level currently planned. Annual savings over the 1994-1999 period would average approximately \$690 million. Much of those up-front (as opposed to long-term) savings would come from lower costs for revitalization and replacement. Over the long run, assuming that the inventory reductions were permanent, this option could be viewed as offering a perpetual annual stream of savings of \$450 million. (The two estimates take into account both the cost of paying additional allowances and the cost of raising the average level of allowances to avoid increasing total out-of-pocket costs.)

By enforcing its stated policy of depending on the private sector for housing, DoD could reap large savings and avoid competition between private-sector and government-owned housing. Reducing DoD inventories on the

scale proposed in this option, however, would result in long and growing waiting lists for DoD housing even in locations in which housing was available in the private sector. Therefore, this alternative is unlikely to be carried out without some change in the financial incentives that currently encourage service members to seek on-base housing.

Finally, strict enforcement of DoD's private-sector policy may not be desirable. Many families value the on-base life-style and the security that it provides. Even though DoD housing is more expensive than private-sector housing that appears comparable, in some cases the value that military personnel place on living on-base may justify the extra cost.

Alternatives That Alter the Demand for DoD Housing

Under the current system, the price service members pay for DoD housing is, in effect, the amount of the housing allowance they forgo. The third and fourth alternatives in this study alter housing allowances--the price of DoD housing--in ways that are designed to reduce the demand for DoD housing and encourage military families to shift voluntarily to less expensive housing in the private sector. The fifth alternative in the study takes a different and more far-reaching approach to reducing demand. It divorces the price service members pay for DoD housing from the level of the housing allowance by instituting a rental system for DoD units similar to the rental system that exists for housing in the private sector.

Option 3: Raise Allowances and Cut Basic Pay

Option 3 would raise the levels of housing allowances--and thus the implicit price that military personnel pay for DoD family hous-

ing. In response to the price increase, fewer military families would seek DoD housing, and DoD would be able to increase its reliance on less expensive housing in the private sector without lengthening the waiting lists for its family housing. Total compensation provided to military personnel under this option would be held constant by reducing basic pay by an amount that, after taxes, equaled the increase in housing allowances.

It might not be feasible to increase allowances to the point where the price paid by service members for DoD housing actually equaled the cost of that housing. Yet even a smaller increase in allowance levels might improve the incentives that military families face when making housing decisions by enough to permit DoD to reduce its inventories significantly. One possibility would be to increase allowances by 20 percent for personnel with dependents and offset the increase by cutting basic pay and related compensation by approximately \$1.1 billion, or 2 percent, which would leave after-tax compensation constant. (Housing allowances are not subject to income taxes.)

In response to the increased allowance, a large percentage of those families currently on waiting lists or living in DoD housing might voluntarily choose to live in the private sector. If so, that shift could permit DoD to reduce its stock of housing significantly, opening the way for savings such as those outlined under the preceding option, which called for mandated reliance on private-sector housing.

Although this option would alleviate the incentive problems that encourage military personnel to choose DoD housing, it suffers from several disadvantages. One is that an increase in the housing allowances for married personnel, offset by a reduction in basic pay for all personnel, would arguably be unfair to single service members (who would receive no increase in their allowances). Another disadvantage is that the savings from the option are relatively uncertain because they require that the reduced demand for DoD housing be translated into reduced DoD inventories. To ensure

savings, it might be necessary to combine this demand-side policy with an inventory policy that mandates reductions in the stock of DoD housing.

Option 4: Reallocate Allowances from Low-Cost to High-Cost Areas

The ability of military personnel to afford private-sector housing in high-cost urban areas is of particular concern to DoD housing managers. In many cases, DoD-owned or DoD-leased housing is offered in high-cost urban areas as the only available substitute for allowances that are considered inadequate. Option 4 would increase the regional differentials in housing allowances, lowering allowances in low-cost areas and raising them in high-cost ones. Because this alternative would raise the price military families pay for DoD housing in high-cost areas, it could reduce waiting lists and the pressure to provide DoD housing in those locations.

Under this alternative, the variable housing allowance (VHA) and the basic allowance for quarters (BAQ) would be integrated into a single allowance that reflected the local cost of obtaining private-sector housing of a fixed quality. A standard for housing quality would be established for each paygrade, based on what military families in that category typically obtain nationwide. DoD would set allowances for each paygrade and location so that the out-of-pocket cost of obtaining the standard-quality unit would be the same in both low- and high-cost areas. In addition, DoD would set the level of those out-of-pocket costs so that the total cost of allowances under this alternative would be the same as under the current system.

This option would raise housing allowances in high-cost areas above their current levels and reduce allowances in low-cost areas. Those shifts would occur because the current VHA system bases allowances on the median expenditure for each paygrade in each loca-

tion, as determined by a survey of military personnel living in that location in the private sector. Families in high-cost areas economize by renting smaller, lower-quality units; thus, allowances in high-cost areas tend to reflect the cost of units of lesser rather than fixed quality.

The potential for savings under this option derives from the effect that reduced demand for DoD housing in high-cost areas could have on the size of the DoD inventory. This alternative would also treat families assigned to low-cost and high-cost areas more equitably.

Yet the extent of potential savings from this option is uncertain. If DoD expanded its housing inventory in low-cost areas (because the reduced allowance levels increased demand), additional costs in those areas could offset savings in high-cost locations. Although this option could affect demand for DoD housing in particular locations, it may not provide the kind of fundamental change in incentives that would result in a widespread, voluntary shift toward greater reliance on housing in the private sector.

Option 5: Institute a Rental Market Within DoD

This final alternative dramatically realigns incentives in the family housing system by separating the price paid for DoD housing from the housing allowance. Under this option, housing allowances would be paid to all military families, both those in DoD housing and those in private-sector housing. Families that chose to live in DoD housing would pay rent and the cost of their utilities.

Under this alternative, DoD would set rents and operate its housing in a manner similar to that of a private-sector provider. Rents for each type of unit at each installation would be set to eliminate both persistent waiting lists and vacancies. DoD would continue to operate its existing units as long as the rent they could command covered at least the cost of their con-

tinued operation. However, DoD would revitalize or replace an aging unit only if the rents it anticipated covered the total cost of the unit to the federal government (including amortized capital costs). Because of the relatively high cost of DoD housing compared with housing in the private sector, this policy would probably lead to a large, albeit gradual, reduction in the stock of DoD family housing.

The intent of this option is to maintain the quality of life currently enjoyed by military families, not increase their out-of-pocket costs for housing. To this end, any rental receipts in excess of the added cost of providing housing allowances to families living in DoD housing would be used by DoD to finance an increase in allowances for all military families. As a result, most military families would be better off under this option than they are today.

Moreover, despite the larger allowances the federal government would pay, the option would save money because DoD would operate its existing housing stock more efficiently and gradually reduce its housing inventory in locations in which the value of DoD housing to service members was less than the cost of providing the housing. The amount of savings would depend on the extent of the reduction in DoD inventories. If the rents DoD could charge justified its retaining 25 percent of its units over the long run (as in Option 2), the annual savings between 1994 and 1999 would average approximately \$760 million. Over the long run, this option can be viewed as offering an annual stream of savings of \$480 million in perpetuity. (That figure is the value of all future savings expressed in annual terms using a 3 percent discount rate to take into account the value of money over time.)

In addition to producing savings, the rental approach ensures that the number, type, and location of DoD housing units reflect the housing that military families want. By using rental prices to signal the value of DoD units to military personnel, the department would have an automatic and credible process for determining its family housing requirements. The criterion for construction would be that

the value of the unit to service members must at least equal the government's cost of providing the unit. Using that criterion, DoD might legitimately provide units--even in locations in which housing was available in the private sector--for families that placed a high value on living in a military community.

A secondary advantage is that this rental option gives DoD greater freedom in setting its compensation policies because it separates the price that personnel pay for DoD housing from housing allowances. Indeed, providing DoD housing on a rental basis could make it possible in the future for the military compensation system to rely more on basic pay and less on special allowances that vary according to whether a service member has dependents. Many compensation experts as well as some military personnel would prefer a system with less emphasis on such allowances.

Among the disadvantages of this approach are the one-time costs and risks associated with the shift to a rental system, including the costs of determining the initial rent levels, setting up a system to collect rents, and installing individual utility meters. In addition, a rental system might force DoD to provide rent subsidies to deal with special situations--for example, for historic units, for key and essential personnel who must live on-base, and for those junior enlisted personnel who would otherwise face economic hardship.

A more fundamental concern is whether military families would interpret this option as an attack on the quality of life they currently enjoy. Most military families would benefit from this option in which all of the rent and utility payments collected by DoD would be returned to military families as a whole through housing allowances. But families that prefer on-base housing would be better off under the current system, which subsidizes the cost of that housing. Those families are likely to view a rental system as an erosion of a traditional military benefit. Moreover, introducing a rental system would represent a major change in housing policies and might be inappropriate at a time when the nation is re-

ducing the size of its military forces and many military personnel are anxious or uncertain about their careers.

Although the disadvantages of this option are substantial, they must be weighed against the key benefit of a rental system. A rental system would provide DoD with clear signals

about the housing preferences of military personnel and allow those preferences to shape the department's decisions about family housing. Because DoD family housing would then be limited to those locations where its value to service members was greater than its cost to DoD, it would become a more cost-effective form of compensation for military personnel.

The Current System

The Department of Defense (DoD) seeks to provide the families of all active-duty military personnel with access to adequate, affordable housing. In this effort, the department relies on a combination of private-sector housing and government-owned or government-leased housing. Two-thirds of the approximately 900,000 military families living in the United States receive cash allowances that they use to help defray the cost of renting or purchasing housing in civilian communities near their installations. The remaining one-third of those families forfeit their cash allowances, and DoD assigns them to family housing--houses or apartments owned or leased by DoD and located, with few exceptions, on military bases.

DoD currently spends approximately \$7 billion annually on housing benefits for the families of military personnel living in the United States. Housing allowances account for \$4 billion of that total; the cost of units owned or leased by DoD accounts for the remaining \$3 billion.

Housing benefits, whether provided in the form of cash allowances or in kind, are an important part of the compensation package DoD uses to recruit and retain military personnel. On average, they account for about 24 percent of the regular military compensation of a member of the armed services. (That calculation treats DoD family housing that is provided in kind as if it had a cash value equal to the housing allowance.) In addition to housing allowances, regular military compensation includes basic pay, a basic allowance for subsistence, and a federal income tax advantage (because housing and subsistence allowances are not taxed).

The high quality of today's armed forces suggests that the housing benefits DoD provides have proved at least reasonably successful in meeting the needs of military personnel. Nevertheless, DoD's system of in-kind housing and its system of housing allowances suffer from some well-recognized problems. Members of the military are dissatisfied with the size of their allowances, which have not kept pace with increases in the cost of housing over time. In addition, differentials in the allowances for various regions of the country do not adequately compensate personnel for the higher prices they pay for housing in high-cost areas. DoD recognizes these problems, concluding in a recent review of compensation issues that "the housing allowance has come to present the Department of Defense with one of its greatest, most persistent compensation challenges."¹

DoD's system of family housing also has problems, at least some of which can be attributed to the weaknesses in the housing allowance system. Because housing allowances are, in effect, the price military families pay for DoD housing, low allowance levels spur a demand for more DoD housing, which results in long waiting lists in some areas. Junior personnel in particular may wait a long time for housing, especially in high-cost areas of the country.

Another problem for DoD is that its stock of family housing will become increasingly expensive to maintain. DoD housing managers have responded to the demand for DoD hous-

1. Department of Defense, *Report of the Seventh Quadrennial Review of Military Compensation* (August 21, 1992), p. 7.

ing by placing a high priority on continuing to operate and maintain the department's housing stock in the United States. But most of that housing was built in the early years of the Cold War and is now nearing the end of its service life. According to DoD's estimates, more than \$11 billion is now required to revitalize and replace the aging housing in the system. It is unclear whether that investment can be made during a period of fiscal austerity. It is also unclear how the quality of life of military personnel can be maintained if the investment is not made.

This study identifies options that will maintain the current quality of life for tomorrow's smaller military and still reduce the total cost of DoD's family housing system in the United States. It deals with both the family housing DoD owns and leases and the department's system of housing allowances. Such a dual focus is necessary because policies that change the levels of allowances affect the demand for DoD housing and because changes in the availability of DoD housing affect the total housing allowances that are paid.

The study focuses on family housing in the United States (including Hawaii and Alaska), where more than three-fourths of military families live and where roughly three-fourths of DoD's family housing is located. It does not address the housing problems faced by military families outside the United States, where unique security requirements as well as social and educational needs may affect how or where families are housed. Nor does this study address housing for single personnel, many of whom are housed on military bases in dormitory-style barracks rather than in the individual apartments or houses provided to married personnel.

DoD Family Housing

Until the advent of the Cold War, on-base (or shipboard) housing was the norm for military personnel in peacetime. For the married

Table 1.
Total DoD Family Housing Units Worldwide
(In thousands)

	United States ^a	Foreign	Total
Owned	305	99	404
Leased	8	27	35
Total	313	126	439

SOURCE: Congressional Budget Office based on Department of Defense, *Family Housing Inventory and Occupancy Report*, DD 1410 (September 1991).

NOTE: DoD = Department of Defense.

a. Includes Guam and Puerto Rico.

members of the small peacetime officer corps that the United States maintained in the pre-Cold War era, that meant on-base DoD family housing. For enlisted personnel--who were not expected to have families--it meant barracks. Although married men could be drafted into the enlisted force during wartime, they were expected to leave their dependents at home.

The large peacetime army necessitated by the Cold War and the accompanying shift toward a peacetime enlisted force with many married personnel changed DoD's role in providing family housing. One aspect of that change was growth in DoD's inventory of family housing as the department tried to accommodate the increased number of enlisted personnel with families. Another change has been in the department's philosophy. DoD has moved away from the view that on-base housing should be the norm for married personnel with sufficient rank and has embraced a policy that calls for using private-sector housing--in areas in which it is available and affordable--for the families of both officer and enlisted personnel.

Trends in the DoD Housing Inventory

DoD is the nation's largest landlord, owning or leasing more than 300,000 family housing units (see Table 1). Approximately 3 percent of those units were constructed before 1940.

(A significant number were built in the late 1930s under the auspices of the Works Progress Administration.) Two-thirds of the current inventory, or approximately 200,000 units, was constructed during the early years of the Cold War, between 1950 and 1966 (see Figure 1). Rapid construction was possible during that period in part because of the Wherry and Capehart housing programs, which eliminated the need to appropriate funds in advance by using private-sector financing to build units for military personnel. Although the pace of construction has never again been as rapid, the total number of units in the DoD inventory has continued to rise gradually over time and is now near a historic high (see Figure 2). In recent years, leasing has contributed disproportionately to that growth.

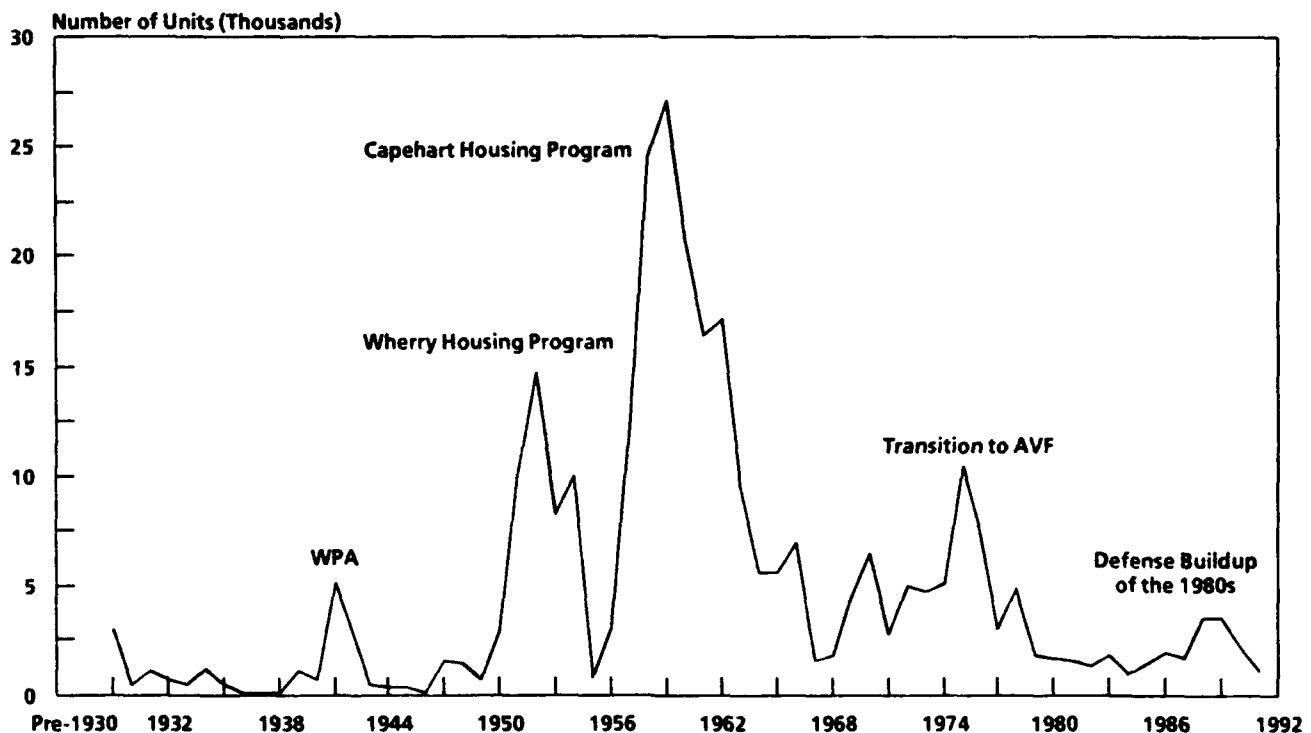
The ratio of DoD family housing units to the number of military families worldwide has ris-

en somewhat in recent decades as growth in the number of units has gradually outpaced increases in the number of personnel with families (see Figure 3). Today, the proportion of military families in the United States who live in DoD housing is the largest since the advent of the Cold War. Over the short term, however, the degree to which DoD relies on its family housing fluctuates with the number of military personnel. When that number rises, as it did during the buildups for the Vietnam War and for the strengthened defense policy of the Reagan Administration, the percentage of military families living in DoD housing temporarily falls.

Where Is DoD Family Housing Found?

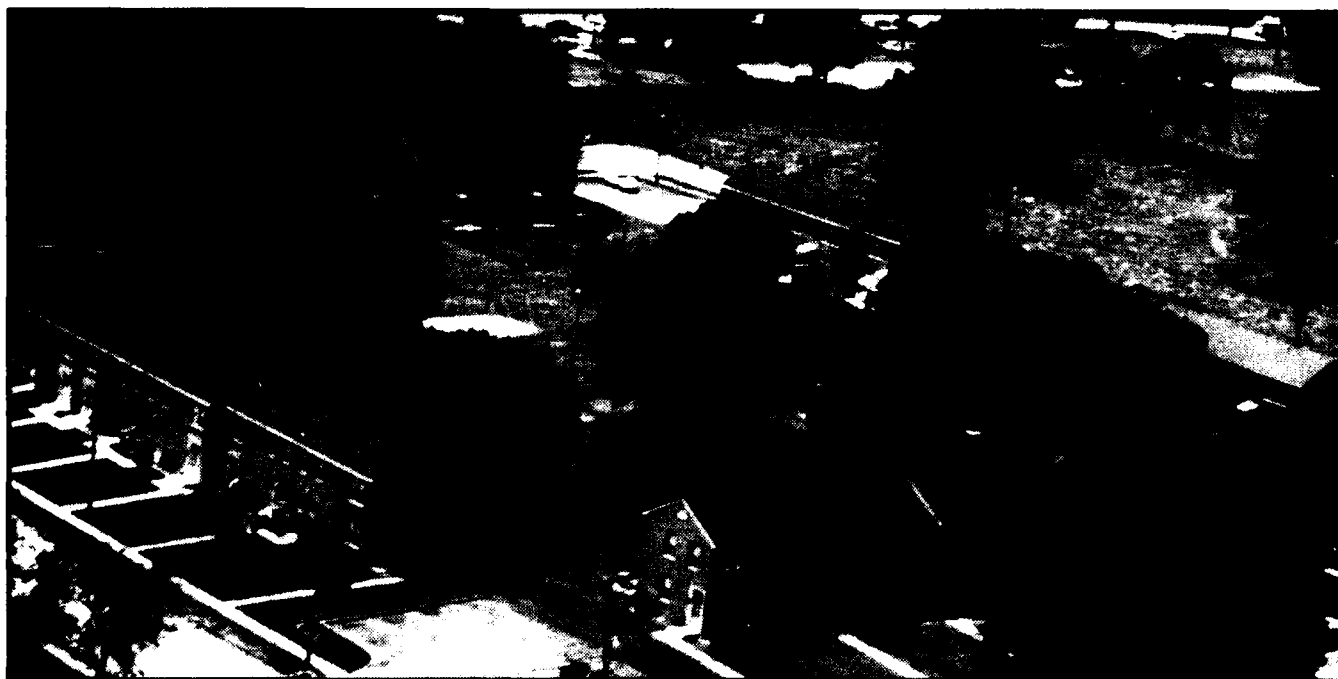
DoD family housing units can be found at virtually all major military installations in the

Figure 1.
Current U.S. Inventory of DoD Family Housing by Year Built or Acquired



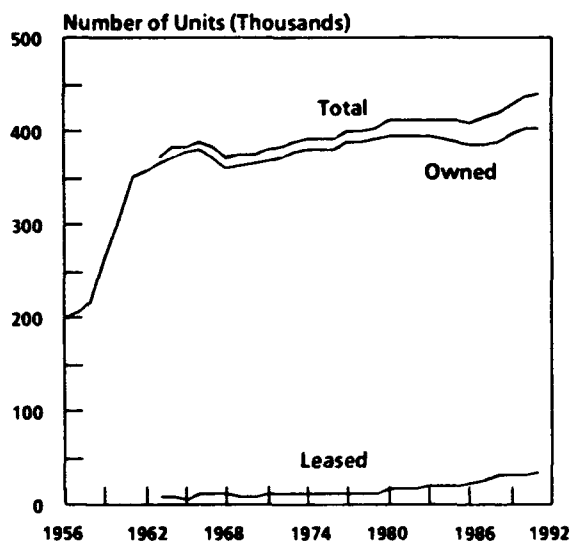
SOURCE: Congressional Budget Office based on the Department of Defense's 1991 records of real property.

NOTES: The Wherry and Capehart housing programs were instituted to provide additional on-base family housing during the early years of the Cold War. Under these programs, it was possible to construct housing for military personnel using private-sector financing rather than appropriated funds. DoD = Department of Defense; WPA = Works Progress Administration; AVF = all-volunteer force.



Midgrade enlisted housing at Fort Bragg, North Carolina, built in 1950 under the Wherry housing program.
(Photo by Bill Burgess, Ft. Bragg Family Housing Office)

Figure 2.
Number of DoD Family Housing Units
Owned or Leased Worldwide, 1956-1991



SOURCE: Congressional Budget Office based on Department of Defense data.

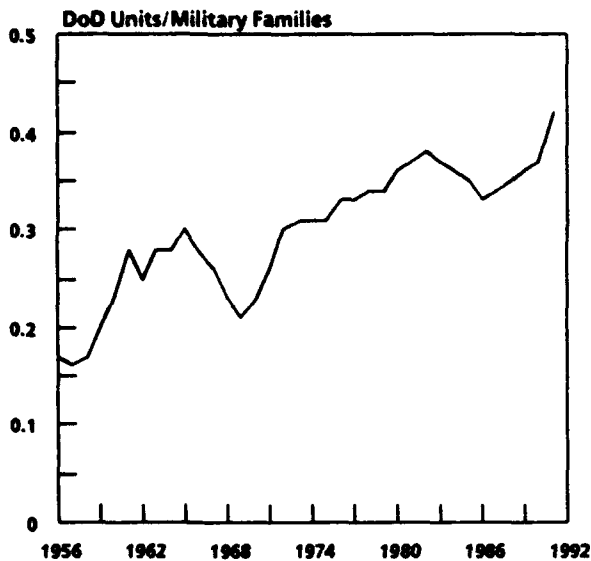
NOTES: The data shown are for Department of Defense (DoD) units worldwide because early historical records do not distinguish between units located inside and outside of the United States.

Data on the number of leased units are not available before 1963.

United States. Their distribution across the country closely reflects the distribution of military families. Approximately half of the units are located in six coastal states (California, Texas, Florida, Virginia, Georgia, and North Carolina) and Hawaii; those seven states also account for half of the military families in the United States. The other half of the DoD housing inventory is distributed throughout the nation. Only eight states (Iowa, Minnesota, New Hampshire, Oregon, Vermont, West Virginia, Wisconsin, and Wyoming) have fewer than 1,000 units (see Figure 4).

The Congressional Budget Office (CBO) analyzed the location of DoD housing units using data for more than 300 military housing areas in the United States (see Appendix A for details). (A military housing area, or MHA, is the geographic area that encompasses all public and private housing within 30 miles, or within a 60-minute commute, of a military installation.) That analysis indicated that the number of DoD housing units in an area depends primarily on the number of military personnel living there. The analysis also indicated that the number of DoD family hous-

Figure 3.
Ratio of DoD Family Housing Units Worldwide
to the Number of Military Families, 1956-1991



SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: The data shown are for Department of Defense (DoD) units worldwide because early historical records do not distinguish between units located inside and outside of the United States. The ratio is based on the total inventory of DoD housing, including vacant units.

ing units tends to be larger in MHAs that do not have a great deal of private-sector housing and that have high costs for such housing. In contrast with the number of personnel in an area, however, the impact of these latter two factors on the number of DoD housing units in different MHAs is relatively modest.

Who Lives in DoD Housing?

Only 20 percent of Navy families and 29 percent of Marine Corps families in the United States lived in DoD housing in 1991, compared with 34 percent of Army families and 34 percent of Air Force families. The Navy's historical lack of emphasis on family housing may derive from the long deployments of its personnel aboard ships (reducing the visibility of family needs). Another possible explanation may be that, in the past, private-sector

housing was more available in seaports than at isolated Army bases.

Differences among the four services may be apparent in the proportion of their personnel who live on-base, but the pattern of housing by paygrade is similar for all of them. The families of junior enlisted personnel (in paygrades E1 to E3) are among the least likely to live in DoD housing and are the most likely to depend on private-sector rental units (see Table 2). That particular pattern reflects DoD policies that, until the mid-1980s, restricted access to most family housing to service members in paygrades E4 and above. Today, access to DoD housing for junior enlisted personnel is gradually increasing: worldwide, 16 percent of such personnel with dependents lived in DoD housing in 1991, compared with 11 percent in 1986. At some bases, however, DoD housing for the families of junior enlisted personnel is still quite limited.

Increased access for the families of junior enlisted personnel is perhaps the final phase of a long-term trend toward greater access to DoD family housing for enlisted personnel as a whole. In 1974, when the all-volunteer force was introduced, 29 percent of the family housing units owned by DoD were set aside for officers. In 1991, only 18 percent of DoD housing was designated for officers. That trend reflects both an increase in the proportion of enlisted personnel with dependents and greater emphasis within DoD on providing family housing for those service members. In 1991,



Historic officers' housing at Fort Leavenworth, Kansas. (U.S. Army photo by Mark Ray)

which is not discussed further in this study, to compensate military personnel for geographic differences in the cost of housing outside the United States.

The BAQ and VHA cover about 80 percent of what the typical military family spends for housing in the private sector. Families pay the remaining 20 percent out of pocket from other income. The BAQ, the largest allowance, covers, on average, 60 percent of a family's actual expenditures for housing, and the VHA typically accounts for an additional 20 percent. In 1992, a military family living in the private sector in the United States received, on average, \$5,400 in BAQ payments and \$1,800 in VHA payments.

All military personnel who do not live in DoD housing are eligible for the BAQ. The amount of the allowance depends on rank and on whether the individual has dependents. It does not depend on geographic location or on the individual's actual expenditures for housing. Because the amount of the allowance does not vary by location, the average percentage of housing expenditures covered by the BAQ differs sharply among locations. In addi-

tion, because annual increases in the rates of the BAQ are tied to increases in basic pay, the average percentage of housing costs that the BAQ covers tends to fall in periods in which the cost of housing is rising more rapidly than military pay.

In 1980, the Congress enacted the VHA to compensate families living in the United States for regional differences in the cost of housing. VHA rates vary by geographic location. They are set for each paygrade and dependency status based on local median expenditures by military personnel for housing. (The Defense Department gathers information on median expenditures for housing in each MHA through an annual survey of military personnel living in private-sector housing.) DoD pays at least some VHA to service members provided that local median expenditures are 80 percent of the national median expenditure by personnel in the same paygrade. More than 90 percent of the military personnel who live off-base are in locations that meet this criterion.

In locations eligible for the VHA, DoD sets the rates of the allowance for each paygrade

Table 2.
Housing Patterns of Military Families in the United States, 1991

Paygrade	Percentage Who Live in DoD Housing	Percentage Who Rent in the Private Sector	Percentage Who Own in the Private Sector	Number of Families (Thousands)
Families of Enlisted Personnel				
E1 to E3	20	76	4	76
E4 to E6	35	41	24	522
E7 to E9	26	20	54	152
Families of Officer Personnel				
W1 to W4/O1 to O3	29	30	41	109
O4 and O5	18	20	62	73
O6	26	15	59	13
O7 and above	67	0	33	1
All Grades	30	36	34	946

SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: DoD = Department of Defense.

and dependency status so that the median out-of-pocket cost (the difference--in dollars--between the local median expenditure for housing and the sum of the BAQ and the VHA) is the same in both high- and low-cost areas of the country. Currently, the median out-of-pocket cost for housing in each VHA location is equal to 20 percent of the national median expenditure for each paygrade and dependency status.

Since 1985, the VHA has been subject to an "offset" that reduces a recipient's payment by 50 cents for every dollar by which his or her total housing allowances (the BAQ plus the VHA) exceed actual expenditures. Unlike the BAQ, which DoD pays to all military personnel living in private-sector housing regardless of their actual expenditures for housing, the full VHA is paid only if the recipient's housing expenditures are at least equal to his or her allowances.

How did this relatively complex system of housing allowances come to be an important element in the compensation of military personnel? Before the Cold War, on-base housing was the norm for personnel during peacetime, and housing allowances played a much more limited role in the compensation system. The notion that DoD housing was the norm for military personnel was used by the U.S. Court of Claims in 1925 to confirm the tax-free status of housing allowances. In the court's view, allowances were not taxable compensation but simply reimbursement for an expense.²

As late as 1948, the Hook Commission, an advisory group appointed by the Secretary of Defense, assumed that sufficient DoD housing would eventually be available to house most military families in peacetime and that allowances for housing would be the exception rather than the norm in the post-World War II era. To support that assumption, members of the

commission argued that military personnel preferred DoD housing located on military bases and stressed the relationship between on-base housing and military readiness.³

The Cold War intervened, however, and the Hook Commission's expectations were not realized. Instead, in response to the commission's recommendations, the Career Compensation Act of 1949 established the BAQ system, which became an important element of military compensation. But including junior enlisted personnel with families in the housing allowance system--like their inclusion in the system of DoD family housing--is relatively recent. The Career Compensation Act marked the first time that most grades of enlisted personnel became eligible for cash housing allowances similar to those that officers receive. Yet junior enlisted personnel could receive the BAQ only at the rate established under the act for people without dependents. Although DoD provided special dependency allowances to prevent hardship for the families of junior enlisted personnel, it was not until the advent of the all-volunteer force in 1973 that those personnel became fully eligible for the BAQ at the rate established for service members with dependents.⁴

At the same time that the housing allowance system has become more broadly based, the level of payments has declined relative to the cost of housing in the private sector. The Hook Commission and its enabling legislation accepted the principle that housing allowances should fully cover prevailing rental costs for housing in the private sector. As a result, the BAQ was to be set at the rate at which 75 percent of the civilians in comparable income groups could reasonably expect to find adequate housing.⁵

2. *Jones v. United States*, 60 Ct. Cl. 552 (1925), as cited in Department of Defense, *Joint Service Housing Allowance Study* (November 1991).

3. Advisory Commission on Service Pay, *Career Compensation for the Uniformed Forces* (December 1948), p. 13.

4. See Department of Defense, *Joint Service Housing Allowance Study*, pp. 2-13.

5. Department of Defense, *Military Compensation Background Papers* (1991), p. 72.

In practice, DoD has never achieved the goal of fully compensating military personnel for the housing costs they can expect to pay in the private sector. Instead, the view that housing allowances should cover those costs fully has shifted toward greater acceptance of service members' paying at least some out-of-pocket costs. Since 1981, the percentage of housing costs not covered by housing allowances has risen from 10 percent to 20 percent.⁶ The Congress tried in 1985 to restructure the allowances so that median out-of-pocket costs would equal 15 percent of the median expenditures of military families. However, existing annual adjustment mechanisms have not kept housing allowances in line with housing costs.

6. Department of Defense, *Report of the Seventh Quadrennial Review*, p. 67.

The Department of Defense recently studied housing allowances extensively.⁷ In part, that attention reflects concern about how members of the military with different family situations (including service members who are married to other service members) should be treated under the current system. It is also evidence of unease about a system in which housing allowances are sometimes perceived as an attempt to reimburse personnel for their actual housing costs and sometimes seen as an integral part of compensation to be paid regardless of what is really spent on housing. Further issues that the DoD studies raise are whether housing allowances are adequate in general and whether they are adequate in high-cost areas in particular.

7. Among the recent DoD reports dealing with housing allowances are *Joint Service Housing Allowance Study* and *Report of the Seventh Quadrennial Review of Military Compensation*.

DoD Housing: Problems and Challenges

The Department of Defense now has more than 40 years of experience in providing family housing--and housing allowances in place of family housing--for a large segment of the armed forces. DoD's dual system of in-kind housing and cash housing allowances is an accepted, familiar aspect of military life. But the close of the Cold War and the accompanying reduction in the size of U.S. forces and the defense budget are likely to pose some new challenges to this system and highlight some long-standing difficulties.

DoD faces four major problems:

1. DoD's current role in providing government-owned or government-leased family housing does not match its stated policy of relying on the private sector to house military families. With the ongoing drawdown of the armed forces, that discrepancy is likely to increase: DoD's plans--which are discussed in detail in Chapter 3--call for a greater percentage reduction in the number of military personnel than in the number of DoD housing units.
2. Compared with private-sector housing, DoD housing costs more over the long run to construct and maintain. As a result, the department's reliance on its housing increases the long-run cost of the package of cash and in-kind compensation needed to recruit and retain a high-quality force.
3. Immediate capital investment is needed over the next few years to revitalize or replace DoD's existing stock of family housing. Those funds will be difficult to find in a period of declining defense budgets.
4. The financial incentives embodied in DoD's system of housing allowances encourage military families to rely on DoD housing rather than seek housing in the private sector. Because the current system hides the full cost of DoD housing from military families, it contributes to the demand for such housing and makes it difficult for DoD to reduce the supply.

Does DoD Enforce Its Policy of Relying on Private-Sector Housing?

DoD's current policy, which is stated in DoD Directive 4165.63-M, is to rely on the private sector for family housing except in instances in which on-base housing is necessary to ensure military readiness or in which adequate, affordable private-sector housing is not available.¹ But DoD cannot credibly justify its current role in providing family housing on the

1. Department of Defense, "DoD Housing Management," Directive 4165.63-M (June 1988).

basis of either of those criteria. Its justifications lack force because of some serious weaknesses in the formal methodology it uses to determine whether adequate, affordable housing is available in the private sector.

Ensuring Military Readiness

Military readiness does not appear to explain the extent of DoD's involvement in providing family housing. Between about 2 percent and 5 percent of DoD housing is designated for individuals in "key and essential" positions who are required to live on-base. Those personnel are primarily senior officers with command responsibilities. Apart from that group, considerations of military readiness do not play a major role in determining who lives in DoD family housing or where that housing is located. DoD uses waiting lists to allocate housing at each installation: it sets up separate lists based on military rank and assigns units on a first-come, first-served basis. In general, individuals in units that may be required to mobilize rapidly are no more likely to live in DoD family housing than are other personnel, unless those individuals are identified as key and essential.

Lack of Housing in the Private Sector

With few exceptions, DoD tries to justify its role as a housing provider on the grounds that adequate, affordable housing for military personnel is unavailable in the private sector. In specific locations, adequate housing for some paygrades is certainly lacking; that rationale, however, does not seem to explain the magnitude of DoD's role in providing housing.

Affordability. Affordability can be an issue for military families who live in high-cost areas of the country. Evidence suggests that the current system of variable housing allowances does not compensate personnel adequately for regional differences in the price of housing (see the discussion in Chapter 4).

Moreover, a general cost-of-living allowance is not available for military families in the United States. Those factors could explain DoD's role in providing housing in high-cost areas such as Hawaii, where DoD has approximately 20,000 housing units.

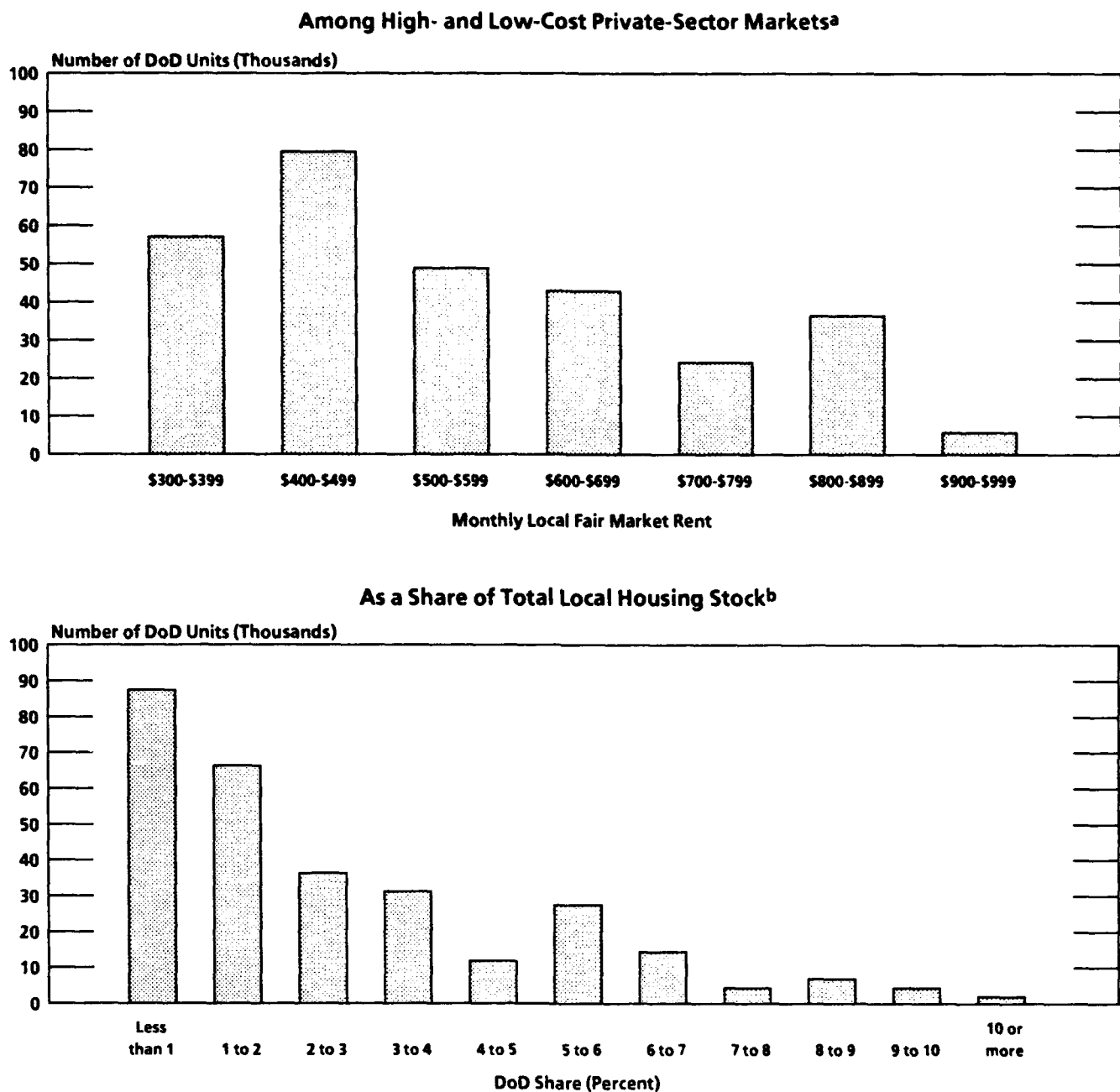
Yet DoD family housing--like the members of the armed services--can be found in low-cost areas of the United States as well. More than half of the department's family housing units are in military housing areas in which the costs for civilian housing are below the national median of \$541 per month (see Figure 5). This median cost is based on the Department of Housing and Urban Development's (HUD's) fair market rent for a two-bedroom apartment.²

DoD's argument that it provides government-owned or government-leased housing because housing in the private sector is unaffordable fails to explain another aspect of the current DoD family housing picture. Junior enlisted personnel--who are least able to afford private-sector housing--are among the least likely to live in DoD housing. And among nonhomeowners (the group most likely to seek DoD housing), the proportion of families living in DoD housing rather than in the private sector generally increases with rank for the families of both officer and enlisted personnel. Despite the ongoing trend toward wider access to DoD housing for enlisted personnel, it still appears that such access increases with rank for those who seek it.

Inadequate Availability. One might expect that DoD housing would be located primarily at military installations in isolated areas in which private developers are unwilling to provide housing. But most DoD units are in areas that have a large market for private-sector

2. HUD bases its fair market rents (FMRs) for Standard Metropolitan Statistical Areas and all nonmetropolitan counties on the 45th percentile of rents for units that meet certain basic standards of quality. The estimates of rental costs for military housing areas in this study are averages of the HUD FMRs for two-bedroom units, weighted by the proportion of military personnel residing in the different counties of the MHAs.

Figure 5.
Distribution of DoD Family Housing Units Among Local Housing Markets, 1991



SOURCE: Congressional Budget Office based on data from the Department of Defense and the 1990 census.

- a. Each Department of Defense (DoD) military housing area (MHA) defines an individual housing market for the purposes of this figure. Private-sector rental costs in each MHA were estimated by DoD's Seventh Quadrennial Review of Military Compensation based on the Department of Housing and Urban Development's measure of monthly fair market rents for two-bedroom apartments.
- b. The DoD share of local housing is equal to the number of DoD family housing units in a military housing area as a percentage of all housing units (private-sector housing units plus DoD family housing units).

housing. Only 20 percent of family housing units are in MHAs in which military family housing accounts for more than 5 percent of the local housing stock (see Figure 5). More than half (53 percent) of the units are in MHAs in which military family housing accounts for less than 2 percent of local housing. Thus, although some units are in isolated locations in which the demand for housing is dominated by the military community, those units are the exception rather than the rule.

The fact that DoD housing accounts for only a small percentage of the total stock of housing near most military installations suggests that the private sector could house many of the families now living in DoD housing. The additional demand for private-sector housing generated by those families would result in some price increases. However, some studies of private housing markets indicate that in a typical market, a price increase on the order of only 2 percent to 3 percent might be needed to accommodate a 2 percent increase in demand over the short run.³ Over the long term--perhaps after 10 years--experts in housing market issues widely agree that prices in a typical market would return almost to their initial levels as the supply of housing in the private sector adjusted to the added demand.⁴

Of course, not all housing markets are typical. Increases in the price of housing in an individual MHA would tend to be smaller if housing were available in areas adjacent to the MHA to which civilians might move. Increases would be greater if little land were available for development in or near the MHA (as is the case in Hawaii, which is bounded by an ocean) or if zoning restricted the way land could be used. In some locations, increasing the number of military families or reducing the stock of DoD housing could lead to significant, prolonged increases in the price of hous-

ing in the private sector. Existing studies of U.S. housing markets, however, strongly suggest that most markets would be able to absorb additional families without significant increases in prices.

Part of the apparent discrepancy between DoD's policy for housing and its actual practices is rooted in history. Most of DoD's existing units were constructed early in the Cold War, when housing nationwide was in relatively short supply after World War II and when the notion that DoD should provide on-base housing for all career military personnel was still widely accepted.

DoD generally retains ownership of its units, once they have been constructed, throughout their entire service lives and regardless of changes in the conditions of the local housing market. Consequently, it is not surprising that most of DoD's existing units are not currently located in high-cost or isolated areas. The historical argument, however, does not explain why the methodology DoD uses to determine its requirements for family housing appears to justify its efforts to revitalize or replace its existing housing stock.

How DoD Determines Whether Private-Sector Housing Is Available

Requests for funding to construct additional DoD housing units or to replace or revitalize existing units undergo heavy scrutiny both by DoD and the Congress. Consequently, housing managers in each of the military services support such requests with detailed analyses of conditions in local housing markets that purport to show a lack of adequate, affordable housing in the private sector. Because most DoD units are in well-populated areas with moderate housing costs, one might expect that this process of analysis and scrutiny would rule out replacing or revitalizing many DoD units and lead to a gradual decline in their number. Instead, the overall trend is toward

3. C. Peter Rydell, *Price Elasticities of Housing Supply* (Santa Monica, Calif.: RAND Corporation, 1982), p. 22.

4. A. Thomas King, "Comment," in Katharine L. Bradbury and Anthony Downs, eds., *Do Housing Allowances Work?* (Washington, D.C.: Brookings Institution, 1981), p. 277.

greater reliance on DoD rather than private-sector housing.

Why does the process that DoD uses to determine its requirements for family housing fail to restrict the department to a more limited role? One answer is that the methodology DoD uses to determine the extent to which the private sector can provide housing suffers from some fundamental weaknesses. Those weaknesses frequently lead DoD to overstate the need for its housing.⁵

The DoD Methodology. Each service performs studies to determine the number of family housing units that it needs to provide in an MHA. Such studies begin by reviewing the service's personnel plans to determine the number of military families who will be stationed in a given housing area in the future (that is, in five or six years' time). The studies then subtract the number of DoD housing units and the number of acceptable, affordable private-sector units that they project will be available to military personnel. The difference, if any, is a "construction deficit" that DoD can use as the basis for a request for funds to construct additional family housing units.

To encourage uniformity, DoD provides formal definitions of what constitutes acceptable housing in the private sector in terms of cost, distance to the base, and various physical characteristics. For example, a unit is considered affordable for families in a particular paygrade if the rental cost does not exceed their housing allowances plus 30 percent of the national median expenditure for housing by families in that paygrade. This figure is the maximum allowable housing cost for that paygrade and location. Units that are more than 30 miles from a base or that require more than a one-hour commute each way are considered unacceptable because of distance.

In addition to an estimate of the number of acceptable housing units in the private sector, DoD's methodology requires an estimate of the portion of that housing that will be available for use by military rather than civilian families. In most MHAs, military families account for only a small percentage of all households. Thus, even when a part of the local stock of housing is deemed inadequate or unaffordable by DoD's standards, the projected number of units that are acceptable is generally much greater than the total number of families at the installation.

As a result, how much family housing DoD requires depends heavily on how much of the future stock of acceptable housing in the private sector is assumed to be available to military families. Estimates of the number of units available to families in different paygrades in the future are often based on current market shares. Thus, if military personnel today occupy 10 percent of the acceptable private-sector housing in an MHA, DoD assumes that in the future they will occupy not only those existing units but also 10 percent of any new units or existing vacant units.

Key Problems with the DoD Methodology. The methodology DoD uses to determine how many on-base housing units it requires suffers from two key weaknesses. The first is its use of the maximum allowable housing cost (MAHC) to indicate whether private-sector housing is "affordable." Because the MAHC is based on housing allowance levels, this concept of affordability does not take into account the total income of the family and thus does not indicate whether the cost of obtaining housing in the private sector constitutes an economic hardship.

For example, neither the total income nor the housing expenditures of families who live in the private sector would be changed by an increase in basic pay that is offset by an equal decline in housing allowances. Yet because DoD uses the MAHC as the criterion for whether housing is affordable, that change in allowances and pay would decrease its estimate of the number of affordable housing

5. Appendix B provides additional details about how this methodology differs from the standard supply and demand analysis that most economists would consider credible.

units in the private sector and increase its estimate of the number of DoD units it needed.

DoD's use of the MAHC to identify affordable housing virtually guarantees that a large proportion of military families will voluntarily choose to live in private-sector housing that DoD considers unaffordable. In particular, families who own their own homes or who have two wage earners are likely to fall into this group.

DoD sets allowances so that half of all military families living in the private sector pay out-of-pocket costs equal to or greater than 20 percent of the national median expenditure for housing for families in their paygrade. The MAHC for each paygrade is reached when out-of-pocket costs equal 30 percent of the national median expenditure. Therefore, families who choose to spend just 10 percent more on housing than the median family in their paygrade and location will spend more than the MAHC if they live in a location in which the local median expenditure is equal to or greater than the national median.⁶

In most cases, DoD has no wish to construct on-base housing for families who prefer to live in housing in the private sector that is "unaffordable" or otherwise unacceptable based on the department's formal criteria. But to avoid such construction, the department is forced to supplement its definition of acceptable housing with subjective criteria. Families who live in housing that fails to meet DoD criteria, including families who spend more than the MAHC, are deemed to be acceptably housed (and thus do not count as part of the requirement for on-base housing) if they consider their housing acceptable. DoD has found it difficult, however, to apply this subjective criterion in its projections of future requirements for its family housing.

It might appear that the department could overcome this difficulty by adopting a standard for affordability based on total family income. HUD, for example, assumes that families who pay more than 30 percent of their income in rent live in unaffordable units. DoD's focus on housing allowances rather than total family income may reflect the fact that housing allowances are provided to military families in lieu of in-kind housing. As a result, the department may consider it inequitable to force military families to rely on private-sector housing when that housing costs significantly more than their housing allowance.

From the DoD perspective, comparisons between MAHCs and families' actual expenditures for housing are important because they indicate whether adequate housing can be obtained (and hence is "affordable") using the housing allowance ostensibly provided for that purpose. Arguably, a lack of affordable housing, as defined by DoD, might be interpreted as a signal that local housing allowances should be increased--not as a signal that additional DoD housing is required.

A second key problem with DoD's formal methodology is its assumption that the military's current "market share"--the proportion of private-sector housing units now occupied by military personnel--indicates the number of such units that the private sector will be able to supply in the future. The market share approach can result in a self-perpetuating requirement for DoD housing. The number of housing units in the private sector that are occupied by military personnel depends on the number of on-base units provided by DoD. With a large number of DoD units, the military's share of private-sector units would tend to be smaller. As a result, the estimated requirement for DoD housing in the future (which depends heavily on the military's current share of housing in the private sector) tends to be larger for locations, services, and paygrades that currently benefit from a large number of DoD units. Thus, DoD housing is likely to be "required" in the future in those places in which it was provided in the past. That may explain why DoD's current method-

6. A recent draft of a DoD directive proposed that the department reduce the MAHC to allowances plus 15 percent of national median expenditures. If that change were instituted, more than half of the military families living in the private sector in each MHA would be living in housing that failed to meet DoD's objective criterion for "affordable" housing.

ology indicates that at least some (if not more) DoD housing is required at almost all major installations.

The construction deficits for individual installations that are shown in DoD's fiscal year 1993 requests to the Congress for funds to construct family housing illustrate this problem. Almost half of those requests show that the proportion of married junior enlisted personnel (paygrades E1 through E3) who are able to find acceptable housing in the private sector is larger than the proportion of more senior enlisted personnel (paygrades E4 through E9) who are able to find such housing in that same location.

The explanation for this seeming anomaly is that junior enlisted personnel have been forced to rely on private-sector housing to a greater extent than more senior personnel because they have traditionally been ineligible for DoD family housing. The current process for determining DoD's housing needs concludes that junior enlisted personnel are therefore less in need of DoD housing than are more senior personnel.

The Long-Run Costs of DoD and Private-Sector Housing

DoD's apparent failure to enforce its stated policy of relying on the private sector to provide housing for military families poses a problem from the standpoint of costs. Over the long run, when the costs of construction and major repairs are considered along with the routine costs of operations and maintenance, it costs more to provide DoD housing than to provide housing in the private sector.

Comparing Costs

It is difficult to compare DoD and private-sector housing costs in any meaningful way. Differences in costs between the two can re-

flect differences in the characteristics of DoD and private-sector units. Moreover, even for units that are physically similar, comparing the cost of a DoD unit with the cost of a unit in the private sector can be misleading because of differences in the way costs are measured. Construction costs per square foot, for example, can differ because the convention that DoD uses to measure square footage is not the same as that used by most private builders.

Differences in the way that costs are covered can also affect comparisons. Housing units in both the public and private sectors require support services--street construction and maintenance, hookups for utilities, security, schools, access to recreational facilities. But the extent to which the cost of that support is incorporated into housing costs, and whether it appears as part of the initial construction cost or is paid for gradually over the life of the housing unit, differ between DoD and the private sector.

Rather than comparing the costs of physically identical DoD and private-sector units, a more useful comparison would focus on DoD and private-sector units that are of equal value in the eyes of military personnel. A comparison of that kind would indicate whether the federal government can provide a given level of benefit to military personnel at a lower cost by offering additional DoD housing or by offering cash compensation and relying on private-sector housing.

Yet DoD's current system of housing provides only limited evidence regarding the value of DoD housing in the eyes of military personnel. The waiting lists typical of such housing indicate that additional DoD units are worth more to military personnel than the housing allowances they would forgo to obtain those units. To determine how much more, however, it would be necessary to know how much rent military personnel would be willing to pay for DoD housing units.

Without that information, one approach is to compare what the federal government spends, on average, to provide DoD housing

for the current population of families living in DoD units with what a group of military families--in the same paygrades and with the same geographic distribution--would, on average, spend in the private sector (see Figure 6). Does that approach differ from a comparison of

the costs of units that have equal value in the eyes of military families? The amount of rent that military families are willing to pay for housing in the private sector reflects the value of such housing in their eyes. Thus, if the average rent military families would be will-

Figure 6.
Average Annual Long-Run Costs of DoD Housing Compared with Private-Sector Housing Obtained by Military Families (In 1993 dollars)

DoD Unit		Private-Sector Unit	
Operations and Maintenance	\$6,200	Housing Allowances	\$7,500
Amortized Cost of Capital	4,400 ^a	Out-of-Pocket Cost	<u>1,700</u>
School Impact Aid	1,900 ^b	Total	\$9,200 ^d
Cost of Land	<u>500^c</u>		
Total excluding the cost of land	\$12,500		
Total including the cost of land	\$13,000		

SOURCE: Congressional Budget Office based on data from the Departments of Defense and Education.

NOTE: The figure compares the average cost of a Department of Defense (DoD) unit in the United States with what families now living in those units would choose to spend to obtain housing in the private sector. It assumes that such families would spend, on average, the same amount to obtain private-sector housing as similar military families (that is, families in the same paygrade and location) who do live in private-sector housing. It is not necessarily a comparison between units of equal value in the eyes of military families.

- Construction costs were amortized over the service life of the unit using an interest rate of 3 percent. This estimate assumes that initial construction costs are \$100,000, that units are revitalized at a cost of \$60,000 after 35 years, and that units are retired 22 years after being revitalized.
- The average Impact Aid paid by the Department of Education on behalf of the children of families living in DoD units less the average cost of the payment that would be made if those families lived in housing in the private sector.
- The cost of holding land. It assumes that land for a DoD unit is worth \$15,000, on average, and that the annual cost to the federal government of holding an asset is equal to 3 percent of its value.
- This total implicitly includes all of the costs applicable to housing in the private sector, including real estate taxes, the cost of maintenance and utilities, the cost of holding land, depreciation, and interest.

ing to pay for DoD housing equals the average rent that military families would pay for housing in the private sector (\$9,200 from Figure 6), that approach does compare the costs of DoD and private-sector units that have equal value in the eyes of military families.

This method of comparison indicates that even when the costs of federal land are excluded, the federal government spends about 35 percent more to provide DoD housing than military personnel choose to spend on housing in the private sector. If the costs that might be associated with the use of federal land are included, the federal government pays more than 40 percent above what military personnel choose to pay for private-sector housing.

Looking at that same information from a different perspective, the cost of a DoD housing unit to the federal government over the unit's expected service life is approximately \$90,000 greater than what a military family would spend to rent housing in the private sector (see Box 1). (That calculation, as well as later projections of long-term costs, applies a 3 percent discount rate to take into account the value of money over time and excludes the costs of using federal land.⁷)

The DoD side of the comparison reflects existing units in the United States, including Alaska and Hawaii. It includes both the average annual costs covered by the family housing operations and maintenance appropriation and the average cost of construction amortized over the service life of the DoD unit.⁸ It also includes school Impact Aid that the Department of Education pays to local governments to help cover the cost of educating the

dependents of military personnel. (DoD housing units are not subject to local property taxes.)

The comparison shows totals that both include and exclude the cost associated with the use of federal land. That cost should be included in figuring the cost of family housing to the federal budget only if the federal government, in the long-run absence of that housing, would either sell the land or use it for a federal program that would otherwise require a land purchase.

The private-sector portion of the comparison takes into account the paygrade and location of the families who now live in DoD housing and calculates what they would spend on rent and utilities if they lived in the private sector. It assumes, for example, that the family of an E6 living in DoD housing in a particular MHA would spend the same amount as the median family of an E6 currently living in the private sector in that MHA. The calculation uses data on median housing expenditures for each MHA and paygrade derived from the survey of military personnel that DoD conducts to set rates for housing allowances.

Yet the comparison presented here is not necessarily between units of equal value in the eyes of military families. If military personnel were unwilling to pay as much to rent DoD units as they pay to rent private-sector housing, then the comparison would be between a private-sector unit and a DoD unit that was less desirable in the eyes of military families. In that case, the comparison would understate the cost advantage of housing in the private sector compared with DoD housing. Conversely, if military families were willing to pay more to rent DoD units than they currently pay for units in the private sector, then the comparison would overstate the cost advantage of private-sector housing.

Nonetheless, private-sector housing will be at least somewhat less costly than DoD housing that has equal value in the eyes of military families as long as the rent that DoD units would command was less than their full cost in

7. CBO's analyses typically use a discount rate of 2 percent and examine the sensitivity of results to rates of between zero percent and 4 percent. Because of the long-term nature of the projections in this study, and to be more consistent with practices of the executive branch, a discount rate of 3 percent has been used in CBO's calculations. Appendix C examines the sensitivity of results to discount rates ranging from zero percent to 4 percent.

8. See Appendix C for the calculation of the amortized cost of capital and for additional details about the estimates underlying Figure 6.

the long run (\$12,500 per unit per year, on average; see Figure 6 on page 18). If the value of DoD housing to service members is less than the cost of that housing to the federal government, the compensation package that minimizes the cost to the federal government of retaining high-quality personnel will be one that relies on cash payments rather than on DoD housing.

Despite the uncertainty about the value of DoD housing, it might not be unreasonable to assume that the rent that military personnel would be willing to pay for DoD units does not differ dramatically from the rent that they actually pay for units in the private sector (and thus that the comparison in Figure 6 is between units that are not of greatly dissimilar value in the eyes of military personnel). Al-

Box 1.

Decisions About DoD Housing Inventories: How Much Money Will They Save?

Comparing annual costs over the long run (as in Figure 6 on page 18) is useful for making judgments about the relative costs of Department of Defense (DoD) and private-sector housing. But to determine the total costs associated with decisions about DoD inventories, it is useful to focus on the value to today's taxpayers of the entire future "stream" of costs or savings that stem from those decisions.

The Congressional Budget Office (CBO) has estimated the value of the future stream of savings from different decisions about replacing or revitalizing a single DoD family housing unit. (These estimates do not include the possible savings from a reduced requirement for federal land.) In each case, CBO calculated a "present discounted" value for those savings by discounting future savings at a 3 percent annual rate. That approach takes into account the fact that such savings are worth less than current savings to today's taxpayers.

CBO estimated that the present discounted value of federal savings from retiring rather than replacing a DoD unit would amount to \$140,000 over the expected service life of a typical replacement unit. (That estimate assumes an expected life of 57 years for the replacement unit; see Appendix C for details.) The estimate takes into account what the government saves by not constructing, operating, and maintaining the unit throughout its service life as well as the costs incurred in providing housing allowances to an additional family. If DoD retires rather than replaces a unit as part of a permanent inventory reduction, the discounted present value of federal savings is \$170,000. That estimate includes both the \$140,000 saved by forgoing the initial replacement project as well as the discounted savings from forgoing subsequent projects.

Deciding to retire rather than replace a DoD unit has economic impacts beyond those that appear in the federal budget. When DoD reduces its inventories, total resource savings are less than federal savings because more families must pay out-of-pocket costs to obtain housing in the private sector. CBO estimated that the present discounted value of resource savings (that is, federal savings less the additional out-of-pocket costs of military personnel)

would amount to \$90,000 over the expected service life of the replacement unit. If the inventory reduction was permanent (so that there were discounted savings from forgoing subsequent replacement and revitalization projects), those resource savings would equal \$110,000.

Savings from a decision to retire rather than revitalize a unit can also be substantial. CBO estimated that the present discounted value of federal savings from such a decision would amount to \$70,000 over the additional service life of the revitalized unit. (That estimate assumes that revitalization adds approximately 22 years to the service life of a unit; see Appendix C for details.) If deciding not to revitalize a unit resulted in a permanent reduction in DoD inventories (so that the costs of future replacement and revitalization projects were avoided), the federal government would save \$150,000 in discounted terms. CBO estimates that resource savings (federal savings less the out-of-pocket costs of military personnel) would equal approximately \$40,000 during the service life of the revitalized unit. The resource savings from deciding to reduce DoD's inventory permanently by retiring rather than revitalizing a unit would be approximately \$100,000.

Each of these estimates is based on the same data for DoD and the private sector that were used for the annual cost estimates shown earlier (see Figure 6 on page 18). In many respects, they are simply a different way of presenting the same information. For example, Figure 6 indicates that in annual terms, DoD units cost \$3,330 more than private-sector units (excluding the cost of using federal land). If a 3 percent annual discount rate was applied, a permanent savings stream of \$3,300 a year would have a value today of \$110,000. That figure is the estimated savings in resources from a policy decision to reduce the DoD inventory permanently by retiring rather than replacing a single unit. Because the estimates of present discounted savings presented here are based on the same data as the estimates in Figure 6, the limitations and uncertainties that apply to that earlier cost comparison also apply to these estimates.

though differences exist between the DoD units and units in the private sector, they may be offsetting.

On the one hand, DoD housing managers sometimes argue that DoD must revitalize its stock of housing to keep it comparable to the housing obtained by military families in the private sector. Thus, the current widespread backlog in revitalization could be an indication that the quality of DoD units does not--in general--match the physical quality of units in the private sector and that DoD units would rent for less.

On the other hand, military families who value the way of life made possible by on-base housing might place a higher value on DoD housing than they would on physically comparable housing in the private sector. In that case, DoD housing might rent for more than housing in the private sector.

Why Do Costs for DoD and Private-Sector Housing Differ?

DoD relies heavily on private-sector firms in its military housing system. It uses private contractors working under the supervision of either the Army Corps of Engineers or the Naval Facilities Engineering Command to design and build its family housing units. In many cases, it again employs private contractors that specialize in housing management to maintain the completed units. Using private-sector firms for such work may help bring the costs of constructing and maintaining DoD housing closer to the level of those costs in the private housing market. But firms that construct or maintain DoD housing face different problems and a different set of costs than firms that deal with housing in the private sector.

For example, the process by which units are planned and sold is sharply different for DoD and for the private sector. For DoD units, up to 10 years may be needed for the process of market analysis, budget planning, Congressional authorization, bid preparation, bid se-

lection, construction, and acceptance of the completed units. The costs incurred by the Army Corps of Engineers or the Naval Facilities Engineering Command during this lengthy process are funded through an overhead charge that these agencies add on to the cost of military construction projects.

Other costs, including the costs of preparing a bid for the work, are borne initially by the contractor and then passed along in the size of the bid. In contrast, developers and builders of housing in the private sector can work much more quickly, although unlike DoD, they face additional costs and risks in marketing their units.

Another difference between DoD's costs and those of the private sector is the cost of labor. DoD's construction projects fall under the Davis-Bacon Act, which requires that federal construction projects pay "prevailing wages." Although the prevailing wage referred to in that legislation is the local prevailing wage, it has been interpreted to mean union rates even in areas in which local nonunion rates might be more representative of prevailing wages.

According to some estimates, the Davis-Bacon Act increases DoD's construction costs by between 5 percent and 15 percent compared with the private sector.⁹ However, those higher costs may be offset in part by lower costs for materials: a builder working for DoD can order all of the necessary lumber or appliances at one time rather than ordering by increments as housing units are sold and funds become available.

Another important factor in DoD's higher construction costs is the constraints imposed on the design by DoD, the Congress, and the Office of Management and Budget. Those constraints include specifications of the maximum and minimum square footage for different numbers of bedrooms and grades of per-

9. John Barrera and Ronald Maldonado, "An Analysis of Public/Private Ventures for the Construction of Military Family Housing" (Master's thesis, Naval Postgraduate School, Monterey, California, 1990), p. 32.



Typical playground in a military family housing complex at Fort Bragg, North Carolina. Playgrounds are an amenity not usually found in housing developments in the private sector. (Photo by Bill Burgess, Ft. Bragg Family Housing Office)

sonnel. They may also include criteria for the quality of carpets and the adequacy of air conditioning, to cite just two elements of the construction job.

According to an estimate prepared by the National Association of Home Builders, differences in construction because of requirements for increased quality add 12 percent to the cost of DoD housing compared with housing in the private sector.¹⁰ The costs of many of these quality factors--such as lot lots, community centers, and landscaping--might be viewed not as an "extra" cost of DoD housing but as necessary to provide a different kind of unit from that available in the private sector.

Some of the requirements related to quality that raise DoD's construction costs are designed to save operation and maintenance costs in the long run by making DoD units more energy efficient and easier to maintain.

10. National Association of Home Builders Research Center, "Military Family Housing Cost Study: Executive Summary Report" (National Association of Home Builders Research Center, Upper Marlboro, Md., 1987), p. 2.

Yet DoD housing units still cost more than private-sector units to operate and keep up. The Institute of Real Estate Management notes that average operating expenses for rental units in the private sector account for approximately 40 percent of gross rent.¹¹ (Operating expenses include the typical cost of managing the unit, utilities, routine maintenance, and property taxes; they exclude capital costs.) If that percentage was applied to the rent for a typical private-sector unit rented by a military family (see Figure 6 on page 18), operating expenses for the unit would be less than \$4,000--compared with an average operation and maintenance cost of \$6,200 for the DoD unit (or \$8,100 if federal Impact Aid is included).¹²

11. Institute of Real Estate Management, *Income and Expense Analysis for Conventional Apartments* (Chicago: Institute of Real Estate Management, 1992), p. 166.

12. DoD operations and maintenance include some major repair projects whose costs might be counted as capital investment in the private sector, as well as referral services that help military families find private-sector housing. Those items, however, account for only a small portion of the difference between the costs of DoD housing and those of the private sector.

Utility costs, which currently account for about 30 percent of DoD's expenditures for operating and maintaining its family housing, contribute to that cost differential. Families who live in DoD units--unlike most of the families who live in private-sector housing--are not required to pay for their utilities and have no direct financial incentive to economize.

DoD's policy on this point stems in part from a concern that charging for utilities would place an unfair burden on families who are assigned to units that are not well insulated. To promote conservation, the department has relied instead on vigorous public awareness campaigns and has installed energy-efficient features in its housing. Nonetheless, the costs of utilities for DoD units are substantially higher than the costs of utilities for private-sector units. Not basing utility charges on use appears to be a major factor in the higher costs: according to some estimates, the cost of utilities for rental units in the private sector drops 20 percent when people become responsible for their own utility costs.¹³

Maintenance costs account for approximately 50 percent of DoD's expenditures for operating and maintaining its family housing, and they also contribute to high DoD costs. Although DoD housing managers cite the rapid turnover of DoD units as one reason for their relatively high maintenance costs, the difference in turnover between rental units in the private sector and DoD units is not great. Approximately 45 percent of all DoD family housing units turn over each year, compared with about 40 percent of rental units in the private sector.¹⁴ The increasing age of DoD units and the accompanying backlog of revitalization projects could also be factors in the higher costs for maintenance. In addition, because DoD managers are concerned about

meeting military standards for appearance, they may place more emphasis on such elements as painting and floor refinishing than do landlords in the private sector who provide moderate-income housing.

DoD's Assignment Policy Reduces Housing Benefits

Even if DoD could construct, operate, and maintain units as cheaply as the private sector does, the value of DoD housing to military families would be reduced because of the department's policies for assigning units. Under the current system, DoD assigns housing to the family at the top of the waiting list--even if that family is almost indifferent to whether it lives there or in private-sector housing and might be willing to give up its place for a small payment in addition to its housing allowance. Other families at the bottom of the list might greatly prefer on-base housing and be willing to pay something in addition to their allowances to obtain it; the current system, however, prevents them from doing so.

A second factor that reduces the benefit gained from DoD housing is the lack of timely access in some cases. Families arriving at an installation may have to move initially into housing in the private sector and then move again into DoD housing when they reach the top of the waiting list. When waiting lists are very long--so that families reach the top only near the end of their tour of duty at a particular location--the installation's family housing office may have to contact three or four families before it finds one that still has sufficient interest to make the move from the private sector. Families may find it barely worthwhile--or not worthwhile at all--to accept DoD housing at the end of their tour, even though

13. For example, Energy Billing Systems of Colorado Springs, Colorado, a private firm that specializes in converting multifamily rental properties from central to individual meters, cites typical utility savings of 25 percent. The 20 percent figure used in this study is consistent with the estimate used in the 1974 Military Housing Study performed jointly by the Office of the Secretary of Defense and the Office of Management and Budget.

14. Eric Belsky, "Rental Vacancy Rates and Rental Markets," *Housing Economics* (February 1992), p. 11. Belsky's estimated rate of turnover for rental units in the private sector is based on data from the 1980 decennial census by the Bureau of the Census. The turnover rate for DoD units was calculated by CBO using DoD data on 1990 inventories of family housing and the number of moves into DoD units in 1990.

the military bears the financial cost of the local "courtesy move" from the private sector.

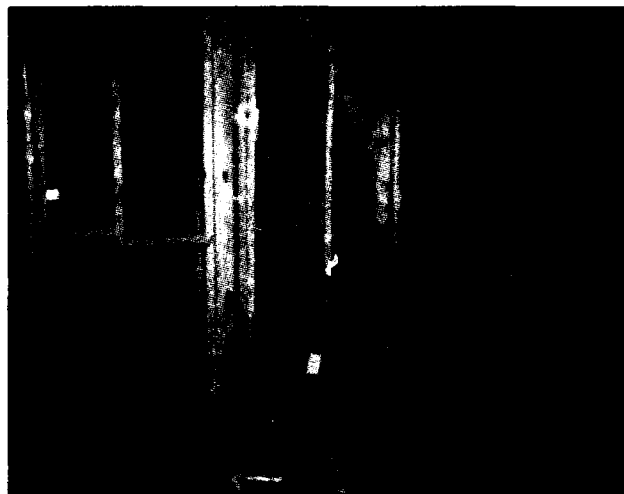
Both of these factors reduce the benefits that military families gain from DoD's current stock of housing. As a result, those benefits would be less than the benefits under a system such as that found in the private sector, which relies on rental charges rather than assignment policies to allocate housing among families.

Near-Term Costs and the Aging of DoD's Housing Stock

In addition to substantial costs over the long term, DoD faces pressure to spend more on family housing during the next few years. Two-thirds of its existing units were built at the onset of the Cold War. Those units are now reaching the end of their expected service lives and, according to the military's housing managers, must either be replaced or undergo major--so-called whole-house--revitalization.

Replacement and Whole-House Revitalization Policies

Replacing or revitalizing a housing unit can be expensive. The median cost of a new DoD unit in the United States is about \$100,000.¹⁵ The typical cost of whole-house revitalization--an investment that extends the service life of an existing unit by approximately 20 to 25 years--is \$60,000.¹⁶



Unit undergoing whole-house revitalization at the Beaufort Marine Corps Air Station in South Carolina. (Photo courtesy of the General Accounting Office)

DoD uses the term "whole-house revitalization" to describe the kind of extensive renovations needed to bring aging units up to DoD's standards. It is a relatively new approach to DoD's housing maintenance that generally proves more cost-effective than multiple, piecemeal maintenance projects, particularly for aging units. Whole-house revitalization can include work required for safety and environmental reasons (such as removing asbestos or lead paint or replacing outdated electrical systems); work aimed at forestalling additional deterioration (new roofs or siding); and other improvements needed to meet DoD's current standards (for instance, changes in the layout of the unit, number of bathrooms, or size of bedrooms).

Whole-house revitalization, however, is not always the most cost-effective solution to DoD's maintenance needs. Replacement construction, for instance, allows more freedom in design and can yield a better-quality product. Because revitalizing units involves lower upfront costs than replacing units (and undergoes less scrutiny in the process DoD uses to determine its housing requirements), there is some risk that DoD will turn to revitalization even in cases in which replacement would be more cost-effective in the long run. No formal DoD policy exists in this area, but many housing managers view as suspect any revitaliza-

15. Based on a memorandum from Dick Hibbert, Navy Facilities Engineering Command, to the Congressional Budget Office, July 5, 1992.

16. Based on a cost estimate for an average revitalization, which was provided in a letter from Robert Stone, Deputy Assistant Secretary of Defense (Installations), to the House Appropriations Committee, July 3, 1991.

tion project whose costs exceed 60 percent to 80 percent of the estimated cost of replacing the unit.

Although DoD's housing managers might be tempted to overuse revitalization, one would nevertheless expect it to play a more prominent role in DoD housing than it does in housing in the private sector. There, the income level that a housing unit serves may decline as the unit ages. Older, less well maintained units in the private sector fill an important niche as low- and moderate-income housing for both civilian and junior enlisted personnel. But because more than 60 percent of DoD family housing is occupied by midgrade enlisted personnel, DoD seeks to provide housing that it considers appropriate for military personnel of that rank. The desire to maintain military standards for appearance, maintenance, and size could make it difficult for DoD to keep aging units in its inventory until the end of their service lives without revitalizing them. Early and frequent revitalization may be one of the inevitable costs associated with family housing units owned by DoD.

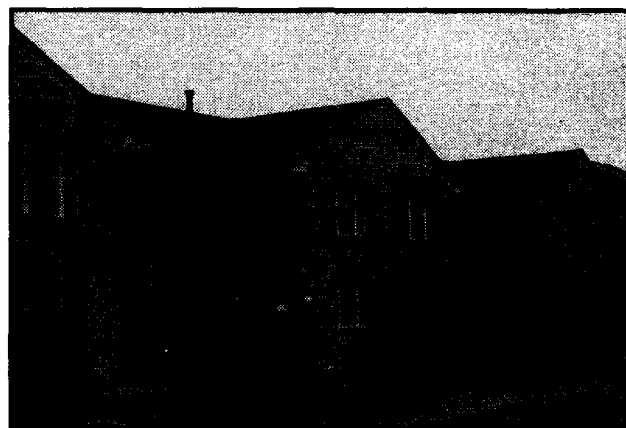
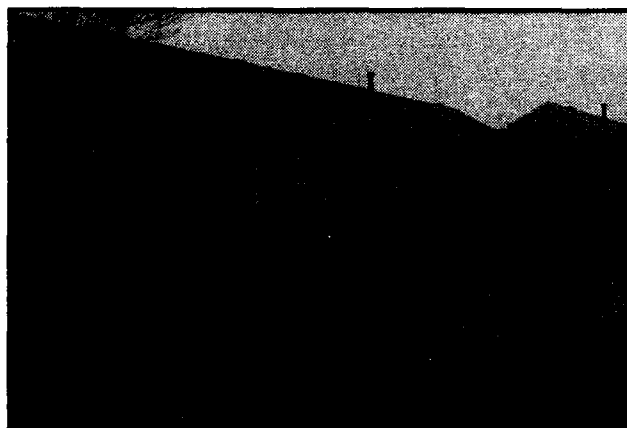
Funding Revitalization and Replacement Construction

The cost of maintaining the current stock of DoD family housing in the United States could

rise substantially over the next few years as a result of the growing number of units that require revitalizing or replacing. CBO estimates that the funding necessary to revitalize or replace U.S. inventories could range from \$800 million to \$900 million per year in the mid-1990s (see Figure 7). From 2010 to 2015, required funding could grow to much higher levels--as much as \$1.5 billion a year--as units that were built at the onset of the Cold War and revitalized in the 1990s reach the point where they must be replaced. (Appendix C describes how CBO estimated those costs.)

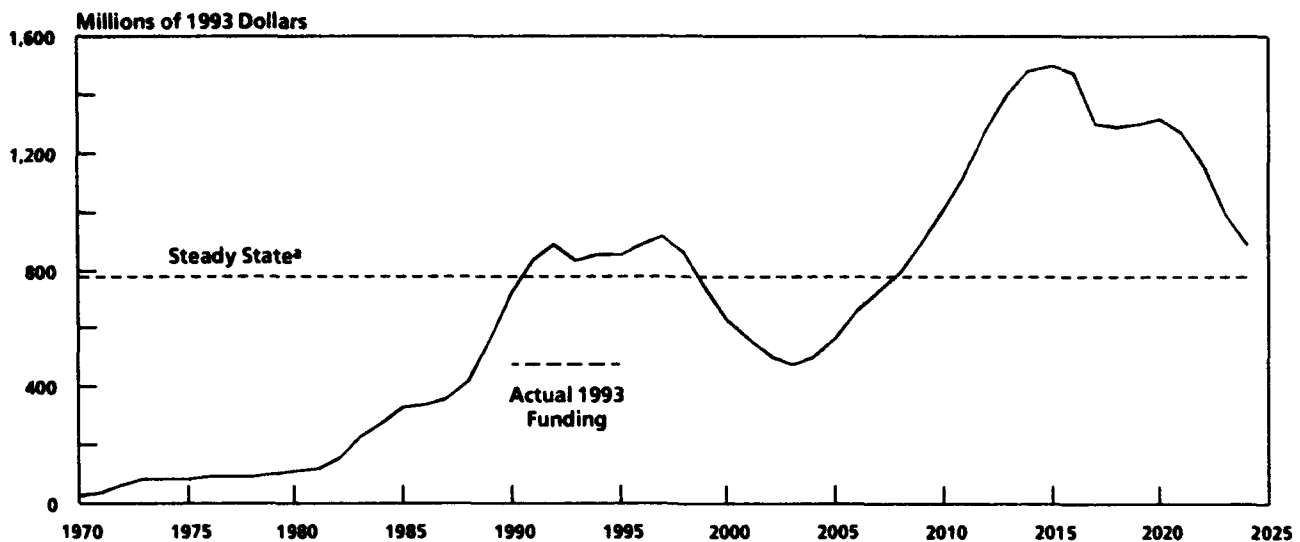
CBO's estimates do not include the funds needed to reduce the backlog that has built up from postponing revitalization and replacement projects in the past. And that backlog continues to grow. For example, CBO estimates that in 1993, DoD needed \$850 million to meet its new requirements for revitalization and replacement, although only about \$500 million of the funds appropriated for family housing construction in that year were designated for such projects.

The extent of the total current backlog, however, is uncertain. DoD estimates that it equals roughly \$11 billion. That figure should equal the sum of past requirements for funding less any appropriated funds. Yet CBO's estimates in Figure 7 indicate that DoD's total past requirements (represented by the area under the line showing annual requirements)



Enlisted family housing at Bolling Air Force Base, Maryland, before (left) and after whole-house revitalization. DoD contractors converted three-bedroom units to two-bedroom ones (to meet current specifications), moved kitchens from the front to the rear of the units, and added family rooms, storage sheds, and fences. (U.S. Air Force photos)

Figure 7.
Estimated Funding Required to Revitalize and Replace Aging DoD Family
Housing in the United States, 1970-2024



SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: These estimates reflect the cost of funding revitalization and replacement projects in the year that each project becomes necessary; the backlog of unmet requirements from previous years is not included in the requirement for succeeding years. The Congressional Budget Office derived these estimates by projecting the future age profile of Department of Defense (DoD) housing in the United States. The estimates assume that units need to be revitalized when they are between 30 and 40 years of age and that revitalizing costs, on average, \$60,000 per unit. They also assume that replacement construction, at an average cost of \$100,000 per unit, is required between 20 and 25 years after a unit is revitalized. These estimates take into account DoD's planned reductions in its housing inventories as a result of the base realignments and closures announced in 1989 and 1991.

a. The average annual funding that DoD will need over the long run for revitalizing and replacing units to maintain its 1997 planned U.S. inventory of approximately 280,000 units.

are less than \$11 billion. This discrepancy suggests either that DoD's \$11 billion estimate is an overstatement or that DoD housing units require revitalization before they reach 30 to 40 years of age.

What happens if enough funds are not made available for replacing and revitalizing DoD's aging units because of tight budgets? DoD could elect to reduce the size of its inventory, retiring houses as they come due for revitalization or replacement. Or it could keep its existing units, allow them to deteriorate gradually, and then simply replace them at about 45 years of age. That approach would reduce the level of funding required during the 1990s, but it would shift the peak requirement for replacement funding from the years beyond 2010 forward to the period from 2000 to

2010.¹⁷ Some of that shift from revitalization costs today to replacement costs in the future is taking place now. It is unclear, however, how far the approach can be carried without unacceptable declines in the quality of DoD housing.

Regardless of the maintenance policies it pursues, DoD faces a very different situation now than it did during the 1970s and early 1980s. At that time, its inventory of family housing in the United States included rela-

17. This shift does not yield significant savings to the federal government over the long run. The capital cost for each year of housing services (the amortized cost of capital) under a maintenance policy that extends service lives through revitalization is similar to the capital cost under a policy that holds units in the DoD inventory for 45 years and then replaces them.

tively few older units. Virtually all of the funding for family housing construction therefore could be used to increase the inventory and reduce any perceived shortages. In the future, however, DoD will require a substantial level of funding for family housing construction simply to maintain its existing stock.

DoD faces large costs to revitalize or replace housing units that are located, for the most part, in areas in which private-sector housing is not only available but also less costly to provide than DoD housing. DoD uses military readiness to justify only a small portion of its family housing needs. Why, then, during the current period of fiscal austerity, does DoD seek to maintain its substantial role in providing housing?

Incentives That Foster Reliance on DoD Housing

Notwithstanding its stated policies, DoD might have other reasons to seek to provide families with on-base housing than ensuring military readiness or compensating for a lack of housing in the private sector. The financial incentives in the current system encourage demand for DoD housing by military families and thus contribute to waiting lists on many bases. Those lists indicate to base commanders and DoD housing officials that they can improve the quality of life of many military families by providing additional on-base housing. In addition, senior military leaders may want to encourage the on-base life-style, which has long been a tradition among the families of officer personnel, on the theory that it reinforces the service member's commitment to the military.

Inappropriate Incentives for Military Families

The current DoD housing system provides what amounts to a price subsidy that hides the

full cost of DoD housing from military families and encourages them to choose DoD housing over housing in the private sector. Over the long run, the rent paid by military families who live in private-sector housing must cover all of the costs incurred by the landlord who provides that housing. For military families living in DoD housing, the situation is quite different. The housing allowances that those families forfeit are, in effect, the rent that they pay for DoD housing. But the \$7,500 in housing allowances that the average family living in DoD housing forfeits accounts for only 60 percent of the \$12,500 that the federal government spends to provide a DoD housing unit (see Figure 6 on page 18). DoD housing is actually about 35 percent to 40 percent more costly than the private-sector housing military families obtain, but it appears to be approximately 20 percent less costly in their eyes--the 20 percent being the out-of-pocket costs they avoid.

Cost is not the only factor military families consider in making their housing choices. DoD housing offers unique features that are valued by some military families. Those features include proximity to commissaries, military medical facilities, and the service member's workplace, in addition to the high level of protection from crime offered by living on-base. Moreover, an intangible spirit links and supports families who live together in a military community.

Yet not all, or even most, families who value the on-base life-style would choose to live in DoD housing if they were faced with paying its full cost. Without a price subsidy, families who chose DoD housing would have to be willing to spend between 35 percent and 40 percent more on housing than the typical family in their paygrade and location currently chooses to spend to obtain housing in the private sector. Even families who found on-base life attractive might feel that DoD housing was not worth its full cost. It seems likely that without the implicit price subsidy for DoD housing, many more families would choose to live in the private sector.

Despite the implicit price subsidy that encourages families to seek DoD housing, some families still choose housing in the private sector. Such housing can offer a greater sense of freedom, more choice in the type of neighborhood and housing unit, and greater proximity to a civilian spouse's place of employment. The private sector also provides an opportunity for home ownership. Moreover, even though DoD housing costs more to produce, it is not necessarily of better quality than the housing that military personnel rent or purchase in the private sector.

Nonetheless, given the magnitude of the price subsidy for DoD housing, it is not surprising that most installations have waiting lists. In the United States, most military families who apply for such housing wait from 1 to 12 months before they obtain a unit. The length of the wait varies not only by installation but also by paygrade and by the quality and type of housing unit being sought.

In general, waiting lists are longest for junior enlisted and junior officer personnel (who generally cannot afford to own a home) and at installations in locations in which housing costs in the private sector are high.¹⁸ But the length of any individual waiting list may not be very meaningful. If an excess of a particular type of unit develops, base commanders are free to open the waiting list for those units to lower-ranking personnel who would not otherwise be eligible for them. Although base commanders have the authority to fill DoD units by requiring families to live on-base, this authority is rarely needed. Most installations cannot offer enough DoD family housing units to accommodate all of the families who would like to live on-base.

Incentives in High-Cost Areas. The prevalence of waiting lists for DoD housing at installations in high-cost urban areas of the United States suggests that the financial incentive to seek DoD family housing is particu-

larly great there. Such a pattern may be surprising. Regions of the country in which the cost of housing in the private sector is high also command high levels of the variable housing allowance for military personnel stationed there. That means that military families in high-cost areas face both a high price for housing in the private sector and a high "price" (in the form of forgone housing allowances) for DoD housing. Why should the demand for DoD housing in those locations be particularly great?

The explanation stems from the fact that the VHA is based on local median housing expenditures by military personnel, not on the local price of housing. Military personnel in high-cost areas respond to the high price of housing by purchasing less of it; because housing allowances are based on those lower expenditures, they do not increase in proportion to the price of private-sector housing.

CBO's analysis of median expenditures by military families in more than 300 MHAs revealed that a 10 percent increase in the price of housing was associated with a 7 percent increase in median expenditures and a 3 percent decrease in the median quality or quantity of housing purchased (see Appendix D). In effect, a family who moves to a new location in which the price of housing in the private sector is 10 percent higher finds that the price of DoD housing there (that is, the allowance he or she must forgo) is only 7 percent higher. That discrepancy makes DoD's family housing particularly attractive in high-cost areas and contributes to long waiting lists--and pressure on DoD to provide more housing in those locations.

The Seventh Quadrennial Review of Military Compensation questioned the equity of the current VHA system in which allowance levels are based on expenditures rather than prices. Equity is a problem because although the current VHA system ensures that the median out-of-pocket costs of military personnel in high- and low-cost areas of the country are the same, a family in the high-cost area would pay that median out-of-pocket cost for a hous-

18. This assessment of typical waiting times was provided by the Directorate of Family Housing in the Office of the Secretary of Defense.

ing unit of lower quality. It could be argued that the military needs a system of regional allowances based on prices rather than expenditures. That kind of system would resolve the equity problem and would also reduce the long waiting lists in high-cost areas and the accompanying pressure to provide more DoD family housing.

Incentives for Personnel with Many Dependents and Junior Personnel. DoD structures its housing allowances so that the financial advantage offered by the department's housing, in addition to being particularly great in high-cost areas, is also greater for personnel with large numbers of dependents and junior personnel. The size of the on-base unit to which a member of the military is entitled depends on the number and age of his or her dependents as well as on rank. In contrast, the level of the housing allowance (the "price" the service member pays for DoD housing) depends only on the presence of dependents and not their number. As a result, military personnel with large families have an added incentive to seek DoD housing.

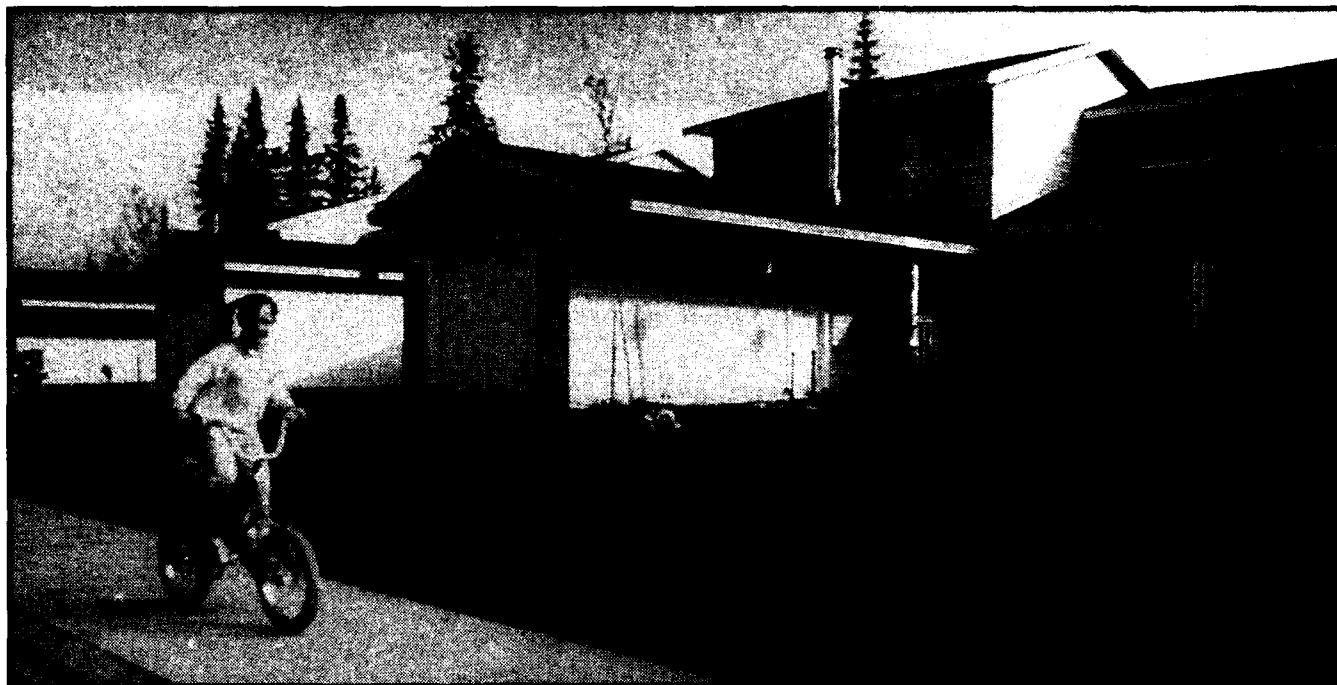
Junior personnel also find DoD housing particularly attractive. Because DoD figures allowances by paygrade and bases them on the median expenditure for housing by each group, allowances for junior personnel in the private sector may reflect the cost of renting low-quality, poorly maintained units. As a result, the difference between the housing allowance and the cost to the federal government of providing a relatively well-maintained DoD unit--the implicit price subsidy for DoD housing--is likely to be particularly great for junior personnel, especially at installations at which they have access to the same units as midgrade enlisted personnel. Of course, DoD might want to subsidize a particularly large share of the cost of DoD housing for junior personnel. But that subsidy contributes to long waiting lists for those personnel--even in locations in which housing in the private sector is both available and affordable.

Incentives for DoD Decisionmakers

Clearly, military families have both financial and other incentives for seeking DoD housing. Yet the supply of that housing reflects decisions made by base commanders, housing managers, and senior military leaders as well as civilian political leaders. The waiting lists of military families who want DoD housing translate into greater reliance on such housing only to the extent that those decisionmakers respond to that demand. Several factors suggest why they might respond to and even encourage the demand for DoD housing.

Improving the Quality of Life of Military Families. A major consideration for DoD in making decisions about housing is its desire to improve the lives of military families and offer a package of cash and in-kind benefits that will be attractive to high-quality personnel. Although waiting lists for DoD housing do not necessarily signal a lack of acceptable housing in the private sector, they indicate that, given the current levels of allowances, additional DoD housing increases the welfare of military families. Overall, the notion that DoD provides housing because it is one way to offer extra in-kind compensation to military personnel may best explain why its housing units accommodate more than 30 percent of military families. It may also explain why those units are available at almost all major installations and why access to them--like access to other forms of compensation--increases with rank.

But why does DoD use on-base housing to improve the lives of military personnel when it might be more cost-effective to provide cash and allow service members to purchase less expensive housing in the private sector? A variety of institutional factors appear to explain this preference. For example, base commanders do not control the levels of military pay or housing allowances, but they can--and do--use in-kind housing as one of their major tools to increase the welfare of their people. In addi-



Modern family housing at Fort Wainwright near Fairbanks, Alaska, contributes to the quality of life enjoyed by military families. (U.S. Army photo by Jonas Jordon)

tion, funds for the construction, operation, and maintenance of family housing are appropriated by the Congress specifically for that purpose, and DoD is not free to consider other uses for those funds. Housing managers, for their part, have a vested interest in using their own "product"--DoD housing--to maintain the quality of life of military families.

Finally, cost-effective trade-offs between in-kind family housing and other elements in the total package of military compensation are complicated by the institutional structures of the decisionmaking units: the military services, the Office of the Secretary of Defense, and the Congress. Each is set up so that the decisionmakers who are primarily responsible for issues related to family housing are not the same as those responsible for issues of compensation and housing allowances.

DoD Housing and the Nature of Military Service. Intangible factors may also contribute to the favor with which many senior military leaders view DoD's role in providing family housing. Such leaders are familiar with the tradition of military communities. Many

believe that the on-base life-style reinforces the commitment that military personnel have to the military. In their eyes, a military career is not merely a job in the civilian sense but a way of life. Separate military communities that reflect that viewpoint are arguably good for the military in the long run. That attitude supplies a rationale for providing DoD housing even in situations in which military families might prefer housing in the private sector.

The price subsidy for DoD housing that is implicit in the current DoD housing system is consistent with a desire to encourage military communities. But that desire conflicts with DoD's stated policy of relying on the private sector to house military families and with the department's efforts to minimize the cost of the total compensation package needed to retain high-quality military personnel. How does this conflict affect DoD's plans for its family housing system, and are there alternative approaches that would allow DoD to enforce its policy and reduce the cost of retaining a high-quality force?

Options That Alter Inventory Plans

Today's tight budgets argue for carefully reviewing the Department of Defense's plan for its inventory of family housing and considering alternative inventory plans that might offer savings. DoD's inventory plan would basically maintain the department's existing family housing in the United States (apart from those units affected by base closures), thus increasing the proportion of families who live in DoD housing. That approach would, in turn, reduce waiting lists at many installations and improve the quality of life of many military families.

In addition to reviewing the DoD plan, the Congressional Budget Office examined two other plans that would reduce DoD's inventory of family housing. The first would retire enough aging units to hold constant the proportion of military families in the United States who live in DoD housing. The second plan would retire even more aging units so as to enforce DoD's stated policy of relying on the private sector and reduce the proportion of families in DoD housing. Both options yield significant savings in the near term, relative to the DoD plan, because they avoid the near-term costs of revitalizing or replacing the aging units that are retired. The quality of life of families who prefer DoD housing, however, is better under the DoD plan.

The DoD Plan for Family Housing

Housing managers in each of the armed services say that one of their highest priorities is

to continue operating and maintaining the existing stock of DoD housing in the United States. The DoD plan, therefore, calls for few units to be removed from the department's inventory except in locations in which bases are actually being closed and in which there are no nearby bases that require the units. A decline in the number of personnel at a base need not be associated with a reduction in the stock of DoD housing: most bases have waiting lists, and it will not be difficult to keep the existing units filled.

Based on the data DoD made available to CBO, the department expects that the number of units it owns in the United States will decline by approximately 23,000, or 7 percent, between 1990 and 1999. Most of that reduction would result from the base closures and realignments that were announced in 1989 and 1991.¹ But some of the decline would be offset as leases that have already been authorized added new units to the existing stock.

The number of DoD family housing units in the United States (both owned and leased) is projected to decline by only 4 percent between 1990 and 1999. Yet over that same period, the number of military families in the United

1. The effect of the base closures proposed by DoD in 1993 and submitted to the Base Realignment and Closure Commission has not been quantified. In discussions with CBO, DoD housing officials indicated that they did not expect the additional base closures that have been proposed to have a significant impact on their overall inventory plans. In this analysis, the DoD plan for family housing for 1994 reflects the 1994 Clinton budget, whereas the housing plan for 1995 through 1999 is consistent with figures released by the Bush Administration in January 1993.

States is projected to decline by 27 percent.² The net effect could be to increase the percentage of military families in the United States who live in DoD housing from the 1990 level of 30 percent to an estimated 33 percent in 1993 and 38 percent in 1999.

The percentage of military families living outside the United States who rely on DoD housing is also expected to increase. Between 1990 and 1999, DoD plans to decrease its inventories outside the United States by approximately 24 percent, although the number of military personnel overseas will fall by approximately 53 percent.

Thus, the overall trend toward increased reliance on DoD housing in the United States is very clear and unlikely to be reversed without a significant change in the DoD plan. The actual extent of the increase, however, will depend on the additional base closures that are announced, the additional cuts--if any--in U.S. forces that are planned, and the new construction projects that DoD might propose in the future but that are not yet reflected in the DoD plan. Although DoD anticipates needing relatively few additions to its stock of housing in the United States, each service can identify specific bases at which realignments will, in its view, increase the need for DoD housing.

What Are the Costs of the DoD Plan?

If DoD carries out its inventory plan, CBO projects that the total funding required for DoD family housing worldwide will remain at around \$4 billion annually--a historically high level--from 1994 through 1999. DoD plans to reduce its stock of foreign housing, which would bring the levels of required funding for operations and maintenance below recent historical levels. But those lower funding levels would be largely offset by an increasing need

to revitalize and replace existing units as outlined in Chapter 2.

CBO estimated the minimum future level of funding required for DoD family housing throughout the world. It based that estimate on the funding required to operate and maintain DoD's planned inventories and the level of construction funding required to hold constant the backlog of needed revitalization and replacement projects in the United States (see Figure 8). (The estimates of required funding for revitalizing and replacing family housing units are those described on pages 25-26; the estimates of required funding for operations and maintenance were derived from the DoD plan for inventories and the average costs per unit in 1991 for operations and maintenance in the United States and overseas.) Because of uncertainty about DoD's plans, that minimum estimate does not include the funding required for revitalizing, replacing, and constructing new family housing units overseas or for constructing additions to the stock of DoD housing in the United States. Another, higher estimate of DoD's funding requirements (also shown in Figure 8) includes the funding in that minimum estimate of requirements plus \$240 million each year for overseas requirements and new construction in the United States. That figure is the actual level of funding requested for these programs in the 1994 budget.

Not all of these projected requirements will be fully funded under the DoD plan. Comparing the funding levels in the DoD plan with CBO's estimates of what is required suggests that DoD's planned funding for operation and maintenance of its family housing is sufficient to meet its worldwide requirements (see Table 3). Funds for constructing family housing worldwide, however, do not appear to be adequate. The average annual funding planned for all family housing construction worldwide--\$800 million--is somewhat less than the amount CBO estimates is required for revitalizing and replacing the U.S. inventories alone. In the past, some of the funds appropriated for constructing family housing were earmarked to provide additions to DoD's U.S. or

2. This estimate reflects the Clinton Administration's plan to reduce active-duty strength to 1.4 million and assumes that approximately 200,000 active-duty personnel will be stationed outside the United States in 1999.

foreign inventories or to revitalize DoD's family housing outside the United States. To the extent that such earmarkings continue, DoD's backlog of revitalization and replacement projects in the United States is likely to increase, with an accompanying deterioration in the quality of DoD family housing. For example, although fiscal year 1993 appropriations largely neglected foreign requirements, more than \$300 million of an appropriation of \$820 million for family housing construction was devoted to constructing additional units in the United States rather than revitalizing or replacing existing ones.

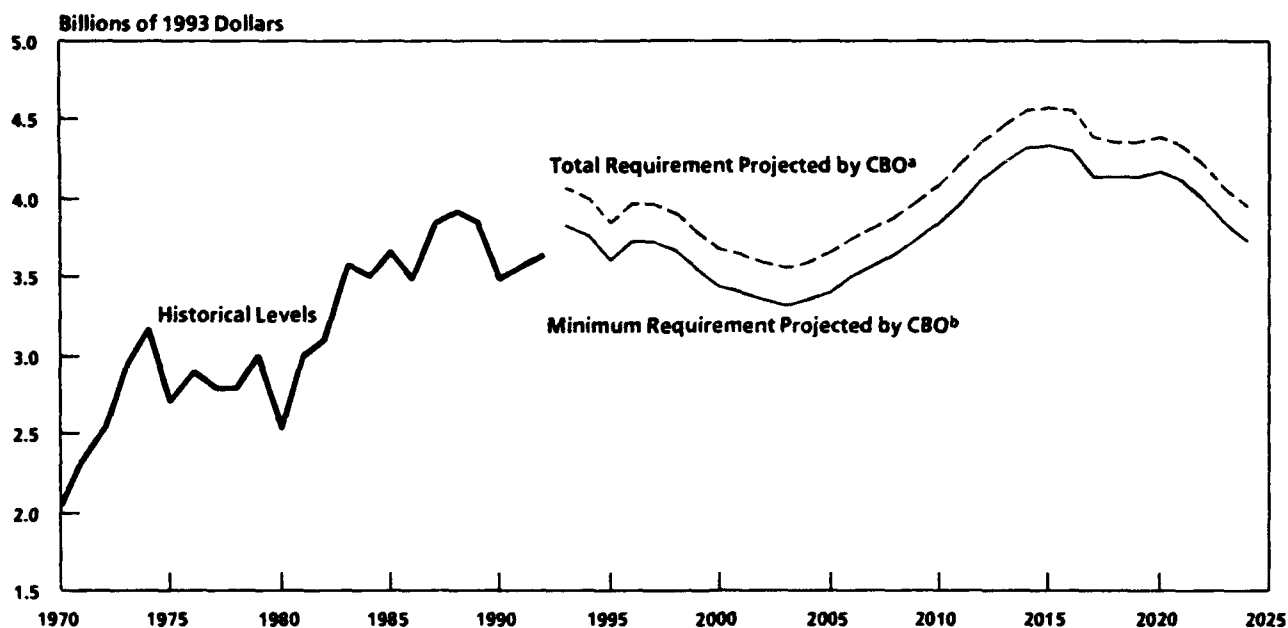
Although the total funding required for family housing is not expected to decline relative to the levels of the 1980s, by 1999 the cost

of housing allowances for families living in the United States could be approximately \$1.7 billion below the 1990 level. The reductions DoD plans in the number of military personnel in the United States, with an associated drop in the number of military families, account for approximately \$1.3 billion of that decline. DoD's plan to maintain its existing housing stock and thus reduce the proportion of military families who receive housing allowances accounts for the remaining \$400 million.

Advantages and Disadvantages

The principal advantage of the DoD plan is that, with housing allowances at their current levels, keeping existing DoD housing units

Figure 8.
Budget Authority for DoD's Family Housing Worldwide



SOURCE: Congressional Budget Office based on Department of Defense data.

NOTES: Numbers represent the budget authority for family housing both in the United States and abroad. They exclude funding for the Homeowner's Assistance Program and for housing units owned or leased by Defense agencies.

DoD = Department of Defense; CBO = Congressional Budget Office.

- The total projected requirement for each year is equal to the projected minimum requirement shown plus \$240 million (the level of funding for family housing construction included in the President's 1994 budget for projects other than revitalizing or replacing units in the United States).
- The minimum projected requirement for each year equals CBO's estimate of the funding needed for operations and maintenance (based on DoD inventory plans through 1997) plus CBO's estimate of the level of funding for family housing construction required to stop growth in revitalization and replacement backlogs in the United States.

open contributes to the quality of life of military personnel. The waiting lists typical of military housing indicate that increased access to DoD units would improve the overall quality of life of members of the armed services. Of course, the impact on quality of life would be greater if all of the required funds were available for revitalizing and replacing aging units. Nevertheless, even units that are in need of revitalizing contribute to the welfare of military families--provided that families chose to live in those units voluntarily. Among the various ranks, junior enlisted personnel could benefit disproportionately from the greater availability of DoD housing. Historically, their needs have been among the last met, and they generally face the longest waits for housing.

The principal disadvantage of the DoD plan is its cost. In the near term, DoD will require additional funding for military construction to revitalize the housing that it built during the Cold War. Over the long run, as Chapter 2 indicates, DoD housing could cost between 35 percent and 40 percent more than private-sector housing. As a result, it could cost DoD much more to improve the quality of life of military personnel by increasing access to DoD housing than by increasing cash compensation (basic pay or housing allowances) and encouraging military personnel to obtain housing in the private sector.

In addition to the higher cost, increasing the percentage of families in DoD housing would contradict DoD's policy of relying on the

Table 3.
Planned Funding and Estimated Required Funding to Support
DoD's Family Housing Program Worldwide (In millions of 1993 dollars)

Category	DoD Family Housing Appropriation for 1993	Clinton Budget for 1994	DoD Planned Funding, 1994-1997 ^a	CBO Estimates of Required Funding, 1994-1997 ^b
Operations and Maintenance	2,950	2,730	2,850	2,810
Family Housing Construction				
Revitalize and replace units in U.S. inventory	480	500	n.a.	880
Other ^c	340	240	n.a.	240
Subtotal	820	740	800	1,120
Total	3,770	3,470	3,650	3,930

SOURCE: Congressional Budget Office based on Department of Defense data.

NOTES: These figures are for Department of Defense (DoD) family housing worldwide because the available data in DoD funding plans do not separately identify funding for family housing in the United States. The figures in the table exclude funding for Homeowner's Assistance and for housing units owned or leased by Defense agencies.

CBO = Congressional Budget Office; n.a. = not available.

- a. Based on average annual levels of funding for DoD family housing proposed by the Bush Administration in January 1993.
- b. Average annual funding.
- c. Includes construction of additions to the U.S. inventory of family housing and all family housing construction outside the United States.

private sector. The department could avoid that contradiction--and some near-term revitalization costs--by reducing the size of its housing inventory.

Option 1: Maintain the Current Percentage of Families in DoD Housing

Under Option 1, DoD would reduce its housing inventory so that the percentage of U.S. military families living in DoD housing in 1999 would be 33 percent--the same as it is today--instead of rising to 38 percent as it would under the DoD plan. The plan would use the ongoing drawdown in forces as an opportunity to increase access to DoD family housing for those who remain in the military. In contrast, this option uses the drawdown to reduce DoD's housing inventories while still maintaining access to DoD family housing at the current rate for those who remain in the military. The units that would be deleted from DoD's stock of housing under this option are units that would otherwise require revitalizing. Removing them would allow significant up-front savings in revitalization costs without any increase in the revitalization backlog.

To hold the percentage of families in DoD housing constant would require reducing the planned DoD inventory by approximately 46,000 units, or 15 percent, by 1999. The department could achieve this goal by retiring 7,600 aging units each year from 1994 through 1999. CBO's estimates (based on the analysis of DoD's revitalization and replacement requirements in Chapter 2 and described in greater detail in Appendix C) indicate that each year between 1994 and 1999, approximately 14,000 units, on average, will reach the age at which they need revitalizing. The 7,600 units to be retired each year could be taken from those 14,000 units or from the existing backlog of units that need revitalizing.

To guarantee that aging units are retired might require that the Congress legislate a re-

striction on the size of the DoD inventory. If funding for revitalization were cut without this restriction, existing incentives could lead DoD to maintain the aging units in its stock of housing. In that case, the backlog of units needing revitalization would increase along with pressure to provide additional funding.

How Much Will the Option Save?

In the near term, this option would produce large savings for the federal government as a result of the lower costs for revitalizing units (see Table 4). From 1994 through 1999, when DoD inventories would be dropping, savings would average \$470 million a year. Total savings during that six-year period would be approximately \$2.8 billion. Average annual savings would be relatively small during the remaining years--from roughly 2000 through

Table 4.
Average Annual Savings If the Percentage of Families in DoD Housing Is Held Constant
(In millions of 1993 dollars)

Category	1994-1999	2000-2014
Military Construction	460	0
Family Housing Operations and Maintenance	120	280
Housing Allowances	-150	-320
School Impact Aid ^a	40	80
Total	470	40

SOURCE: Congressional Budget Office based on data from the Departments of Defense and Education.

NOTES: These figures represent undiscounted savings by the federal government relative to a fully funded DoD plan.

DoD = Department of Defense.

- a. The Department of Education pays Impact Aid to local governments based on the number of school-age dependents of federal employees. The payments made on behalf of dependents who live on federal land (in housing that is not subject to local property taxes) are higher than the payments for those who live in private-sector housing. These estimates are the net savings in Impact Aid that result from shifting families from DoD to private-sector housing.

2014--that the DoD units, if revitalized, would remain in the DoD inventory. In those years, the cost of additional housing allowances would offset most, though not all, of the savings from operations and maintenance and federal Impact Aid.

The savings shown in Table 4 are savings relative to a fully funded DoD plan. If the revitalization of the aging units that are retired from the DoD inventory was not fully funded, retiring those units would slow growth in the revitalization backlog rather than provide immediate savings. The savings in the costs of military construction would be deferred to the period during which revitalization would actually have been funded. If the units deleted from DoD inventories under this alternative are in poor condition, however, these budgetary savings are unlikely to be deferred for long. Ultimately, DoD can only avoid the appearance of being a "slum landlord" if it can secure the funds needed for revitalization or if it can retire the aging units.

If the reduction in inventory proposed under this option was permanent, additional savings would accrue in the years beyond 2014. For

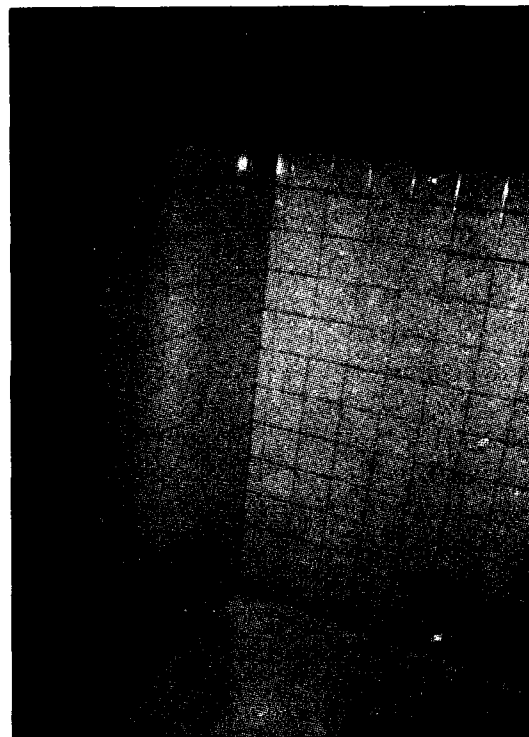
example, a second period of large savings would begin in 2015, when the DoD units, if revitalized, would begin to reach the end of their service lives and need replacing. How much would the total future savings under this option be worth to taxpayers today? When DoD permanently reduces its inventory by retiring rather than revitalizing a unit, the federal government saves approximately \$150,000. (That estimate is discounted to take into account the value of money over time; see Box 1 on page 20.) Assuming that DoD reduced its inventory permanently and taking into account all future savings, deciding to retire rather than revitalize 7,600 units each year for six years would save the federal government \$6.3 billion in discounted dollars. That total is equal in value to a stream of savings of approximately \$190 million a year in perpetuity.

What Are the Advantages and Disadvantages of the Option?

The potential for savings by the federal government, or at least for a slowdown in the



Aging DoD housing in need of revitalization: Ben Moreell housing complex, Navy Public Works Center, Norfolk, Virginia (above); Fort Bragg, North Carolina (right). (Photo above courtesy of the General Accounting Office. Photo at right by Bill Burgess, Ft. Bragg Family Housing Office)



growth of the revitalization backlog, is the major advantage of this option relative to the DoD plan. A second positive feature is that, compared with the DoD plan, this option is more consistent with DoD's stated policy of relying on the private sector for housing. Although the option does not address the fundamental weaknesses in the way DoD determines its need for housing, it could halt the long-term trend toward increased reliance on expensive DoD housing by focusing attention on the size of the DoD housing inventory and on the proportion of military personnel who live there.

The option's most important disadvantage is that by holding the percentage of military families in DoD housing at its current level, it holds the average quality of life of military families constant instead of allowing it to improve as it would under the DoD plan. In addition, restricting growth in the proportion of families in DoD housing could slow the "trickle-down" of units to junior enlisted personnel. Retiring aging units that are in poor repair would reduce that portion of the DoD inventory that is currently the most accessible to junior enlisted personnel.

Neither of these disadvantages is insurmountable, however. Because of the high cost of DoD housing, increases in basic pay or housing allowances could provide military families, on average, with the same quality of life that the DoD plan would offer but at less cost. Furthermore, DoD could offset the impact on junior enlisted personnel of retiring aging units by redistributing the remaining units to benefit them. For example, DoD could raise the percentage of junior enlisted families in the United States who live in DoD housing from 20 percent to 35 percent (to match the percentage of families of midgrade enlisted personnel living in DoD housing). To increase the percentage, the department would have to redistribute 13,000 units, or 4 percent of its inventory, from more senior personnel to junior enlisted service members.

Option 2: Enforce Reliance on the Private Sector

This option is similar to Option 1 in that DoD would reduce the number of housing units and its costs for revitalization by retiring aging units. But Option 1 holds the percentage of military families in DoD housing constant; this option, in contrast, would enforce DoD's policy of relying on the private sector and thus significantly reduce the percentage of families living in costly DoD units. Under this approach, DoD would use the end of the Cold War, which is expected to lead to reduced tours of duty overseas and longer tours in the United States, as an opportunity to reevaluate its role in providing family housing and to encourage a military life-style that is better integrated with the civilian community.

Under this option, starting in 1994 and yearly thereafter, DoD would screen all of its units that were reaching the point of needing revitalizing or replacing and would retain only those that met stringent criteria. Units would be revitalized and replaced, rather than retired, only in locations in which evidence suggested that the private sector was not able to respond to the military's demand for housing--locations with restrictive zoning ordinances or rent control, for example. Requests to construct additional units to meet new requirements would undergo similar screening.

The reductions in DoD's housing inventory under this approach would be greater than those under Option 1. They would take place over a longer period and would include a mix of units--those needing revitalizing and those needing replacing. Although many of the units in the existing inventory would come up for screening by the year 2000, units that have recently been revitalized or replaced would not be screened until they approached the end of their service lives (which could be as late as 2034).

To overcome the strong incentives that foster reliance on DoD housing, the Congress might need to set ceilings on the total number of DoD housing units over time. Provided that DoD did not exceed the ceiling for the year, it would have substantial freedom to determine which units to retire and which to revitalize or replace.

One concern about these large reductions in the housing inventory involves out-of-pocket costs. Because families who live in the private sector pay part of their housing costs out of pocket, increasing the number of those families above the level in the DoD plan would tend to increase total out-of-pocket costs. This option calls for DoD to offset that effect by gradually increasing the level of housing allowances paid to military families in the United States. The increase in the allowance each year would be sufficient to hold total out-of-pocket costs constant, which would ensure that the estimated savings to the government did not include dollars taken out of the pockets of military personnel. The levels of allowances for military families in the United States would be roughly 8 percent higher by the time DoD finished reducing its inventory.

To What Extent Can DoD Rely on the Private Sector?

Just how much would rigorous enforcement of DoD's policy of relying on the private sector reduce the stock of DoD housing? Most experts who deal with housing requirements for civilians agree that the private sector can provide adequate housing for all but low-income families in most U.S. locations. Indeed, DoD civilian employees who work at military installations rely almost exclusively on the private sector for housing.

DoD analysts, however, cite a number of reasons for markets working less well for military families than for civilians. For example, the supply of housing in the private sector may not respond to the demands of military families in locations in which the housing

market is dominated by the military and developers risk losing their investment if a base is realigned or closed. The lack of response by the private sector appears to be a strong argument for DoD involvement at specific locations, although most existing DoD housing is located in military housing areas in which it accounts for less than 2 percent of all housing.

Yet even in locations in which the military does not dominate the market as a whole, it may dominate particular market segments. For example, most civilians seeking large, high-quality houses choose to buy rather than rent. As a result, the rental market for this type of house may be made up mostly of the families of military officers. Because houses can shift from a rental to an owner-occupied status, however, the existence of a large civilian market for owner-occupied housing can still reduce the risk to developers of providing those kinds of rental units.

Another argument against greater reliance on the private sector is that military families, who are subject to frequent moves, do not benefit as much from home ownership as do civilian families. Military families typically have U.S. tours of duty of between three and four years. Because of the costs of obtaining mortgages and selling homes, they may find home ownership a less profitable investment than do civilian families, who on average hold the same mortgage for seven years. Even though two-thirds of the families of officers living in the private sector still choose to own their homes, they suffer reduced benefits from home ownership as a consequence of the mobile military life-style. By itself, however, that argument does not explain why the private market should be unable to provide suitable rental housing.

Another and perhaps more plausible argument is that private housing markets do not work very well for military families who are subject to frequent moves and who are unfamiliar with local rental markets. Frequent moves are a characteristic of both military and civilian renters; in the United States as a whole, between 35 percent and 40 percent of

rental units in the private sector turn over each year.

For military personnel, however, who are often unfamiliar with local markets, frequent moves may be a much greater problem than for civilians. The civilian renter may be moving into a better unit nearby, but the military renter may be moving to an entirely new location and market. In effect, lack of knowledge and the costs involved in searching for housing in an unfamiliar area could raise the price paid by military personnel for rental housing above the price paid by civilians for similar units. To the extent that lack of knowledge is a problem, DoD might wish to enhance its ongoing program of referral services for housing in the private sector. Nonetheless, DoD housing can also be viewed as a solution to this problem because it frees military personnel from the need to deal with unfamiliar housing markets in the private sector.

Another limitation on DoD's ability to rely on housing in the private sector is the burden such a policy may impose on personnel in high-cost locations. For military families with modest incomes, the cost of obtaining housing in high-cost areas (including coastal resorts) can impose real economic hardship. Many experts believe that low-income families in general are not well served by the U.S. housing market, although controversy remains over the extent to which the problem is in the market or in incomes.

Because military compensation (apart from the variable housing allowance) does not vary between high- and low-cost areas, some military families in high-cost areas may be considered low-income families. Although most existing DoD housing units are not in high-cost areas, the rationale that DoD units should be provided to help personnel with modest incomes might apply in specific locations and for particular paygrades. Changes in the VHA system that would tie the allowances more closely to the price of housing in each location could help alleviate this problem (see the discussion in Chapter 4).



Examining options at the housing referral office at Fort Bragg, North Carolina. (Photo by Bill Burgess, Ft. Bragg Family Housing Office)

Finally, civilian landlords may discriminate against military families, although whether discrimination is widespread is not clear. Indeed, some landlords may believe that military families are generally good tenants and discriminate in their favor.

Even though some of the above concerns may not be valid, it could still be inappropriate to assume that housing markets in the private sector will work as well for military as they do for civilian families. The extent to which the private sector can provide housing for military families cannot be known with confidence unless an objective analysis of supply and demand can be carried out for each individual installation. Overall, however, because military housing units are widely distributed throughout the United States in well-populated areas (and not found only in isolated locations or high-cost areas), it seems likely that DoD could reduce the number of its units substantially if the policy of reliance on the private sector were rigorously enforced.

For a number of reasons, local housing markets may, in general, though not in every case, be better able to accommodate military families in the 1990s than they were in the past. Baby boomers are now between 28 and 46 years old, past the typical age at which new households are formed. The demand for hous-

ing is expected to increase only modestly during the next two decades as the so-called baby-bust generation forms households. As a result, some economists predict that housing prices will decline or remain constant over the long run.³ If they do, it suggests that, in general, the private real estate market might easily accommodate the additional housing that would be needed if DoD reduced its role in providing housing.

A further factor is the ongoing reduction in the size of the U.S. armed forces. A trend toward lower housing costs might be anticipated in the private sector near military installations at which personnel (military or civilian) are being reduced. In addition, the drawdown in U.S. forces overseas offers the potential for significantly longer U.S. tours of duty; according to one former Army Chief of Personnel, the length of tours for enlisted personnel in the Army could increase to seven years.⁴ Longer tours would make it easier for military personnel to participate in local housing markets.

Given all of those factors, this study assumes that DoD, after rigorous screening, would be able to justify retaining only 25 percent of its existing units. That proportion would include retaining 5 percent of existing units either because of their historical value or because they are considered essential for military readiness. DoD could justify retaining the remaining 20 percent in areas in which exceptional conditions in the housing market limited the ability of the private sector to provide acceptable housing for military families. The 20 percent figure should be viewed as illustrative; nevertheless, it is consistent with data that indicate that approximately 20 percent of DoD units are in locations in which they account for more than 5 percent of the local housing stock.

Under the above assumption, the number of U.S. family housing units owned by DoD would eventually fall to 25 percent of the level in the DoD plan--that is, approximately 70,000 units rather than 280,000. The decline would take place gradually, however, because DoD would screen only a portion of its housing each year (those aging units that required revitalizing or replacing). For example, under this policy DoD would retire all but 25 percent of the roughly 14,000 units that would need to be revitalized or replaced each year from 1994 through 1999. Those retirements would leave the department's 1999 inventory approximately 61,000 units, or 21 percent, below the level in the DoD plan.

How Much Will the Option Save?

Savings under this option would be greater than those under Option 1. Under this option, as under Option 1, an initial period of large budgetary savings would result while DoD was reducing inventories and avoiding costs for revitalizing and replacing units (see Table 5). The average annual savings to the federal government between 1994 and 1999 would amount to \$690 million (in 1993 dollars, with no discounting). Total savings during this period would equal approximately \$4.1 billion (in undiscounted dollars). Under this option, however, DoD would still be reducing the number of its units--and reaping savings in revitalization and replacement costs--as late as 2034.

Those savings are measured relative to a scenario in which DoD provides the necessary funds for all of its new revitalization and replacement projects. To the extent that DoD did not fund its new revitalization requirements, some of the savings under this option would first accrue in the form of slower growth in the backlog of units requiring revitalizing or replacing. They would not appear as actual savings until the year in which the funds for revitalizing or replacing the aging units would have been provided.

3. Lindley H. Clark, Jr., "Housing Prices--The Revised Forecast," *Wall Street Journal*, December 28, 1992.

4. Comment by Lt. General William Reno, cited by Jim Tice, "A New Army Order," *Army Times*, February 17, 1992, p. 3.

This option would continue to produce savings for as long as DoD maintained its inventories at the lower level. How much would those savings be worth to taxpayers today, assuming that DoD reduced its inventories permanently? Under this option, the federal government would save an estimated \$110,000 by retiring a unit in need of replacement and an estimated \$100,000 by retiring a unit in need of revitalization. (See Box 1 on page 20. The savings to the federal government under this option are equal to the resource savings shown in Box 1 because DoD would raise the level of housing allowances to hold constant the out-of-pocket costs paid by military personnel.)

Those figures represent the discounted value, at the time the units are retired, of the future savings, assuming that the reduction in

Table 5.
Average Annual Savings If DoD's Policy of Relying on the Private Sector for Housing Is Enforced
(In millions of 1993 dollars)

Category	1994-1999	2000-2014
Military Construction	640	620
Family Housing Operations and Maintenance	230	720
Housing Allowances	-230	-960
School Impact Aid ^a	50	200
Total	690	580

SOURCE: Congressional Budget Office based on data from the Departments of Defense and Education.

NOTES: These figures represent undiscounted savings by the federal government relative to a fully funded DoD plan.

DoD = Department of Defense.

- a. The Department of Education pays Impact Aid to local governments based on the number of school-age dependents of federal employees. The payments made on behalf of dependents who live on federal land (in housing that is not subject to local property taxes) are higher than the payments for those who live in private-sector housing. These estimates are the net savings in Impact Aid that result from shifting families from DoD to private-sector housing.

inventory is permanent. They take into account federal savings in expenditures for DoD family housing, including the amortized cost of capital; savings in Impact Aid for local schools; the cost of providing more families with housing allowances; and the cost of raising the levels of allowances by approximately 8 percent so that overall out-of-pocket costs are not increased for the force as a whole. They do not make any allowance for the value of the land currently occupied by DoD units, the residual value that the retired units might have, or the possible costs of demolishing DoD units.

Based on the above figures (and taking into account the gradual timing of the inventory reductions under this option), the future savings from the 21 percent reduction in inventory that would take place by 1999 are worth approximately \$5.6 billion to today's taxpayers. The total of all future savings under this option--assuming that DoD gradually reduced its housing inventory to 25 percent of the planned level--would have a value of more than \$15 billion to today's taxpayers. That total is equal in value to an annual savings stream of approximately \$450 million a year in perpetuity.

What Are the Advantages and Disadvantages of the Option?

The principal benefit from enforcing DoD's stated policy regarding the use of housing in the private sector is the savings it offers to the federal government. This option would reduce both the immediate funding needed to revitalize or replace aging DoD units and the long-term funding needed to maintain a system of DoD family housing. It could also ensure that DoD would not find itself struggling to maintain deteriorating units without adequate funding. Finally, adding "teeth" to DoD's policy of relying on the private sector would ensure that the federal government did not compete with private firms and individuals in what is arguably a nongovernmental function--providing housing.

The impact of this option on the quality of life in the military would be mixed. Military families who would have lived in the private sector in any case (whether by choice or because DoD housing was unavailable) would benefit because of the 8 percent increase in the level of the housing allowance. Junior enlisted personnel might also benefit from greater access to DoD housing under this option because very little housing, apart from that designated for key and essential personnel, would be reserved for senior personnel. However, families who prefer the on-base life-style and who would otherwise have been able to live in DoD housing would be worse off under this option.

Fully enforcing DoD's policy of relying on the private sector might have other undesirable aspects. Although DoD housing is costly, there may still be locations in which the value that military families place on such housing and the associated on-base life-style exceeds the costs incurred by the federal government to provide it. And even in instances in which service members do not place a high enough premium on DoD housing to justify its addi-

tional cost, the unique, military-centered life-style it fosters may provide the military with some intangible benefits. To the extent that those considerations are important, some might argue that DoD should abandon its stated policy of private-sector reliance and adopt a policy more consistent with these other goals.

Finally, even if it would be desirable to enforce DoD's reliance on the private sector, that option may not be practical unless at the same time some changes are made in the incentives that cause military families to seek DoD housing. Under the current system, the allowance that a military family forfeits to obtain DoD housing is typically much less than the cost of that housing. As a result, many families prefer to live in DoD housing rather than in housing in the private sector. Unless some way can be found to reduce this implicit price subsidy and thus reduce the demand for DoD housing, the cut in DoD's inventories envisioned under this option would dramatically increase the length of time families would have to wait for DoD housing.

Options That Reduce the Demand for DoD Housing

The Department of Defense could garner substantial savings by increasing its use of the private sector as a source of housing for military families. But current incentives that encourage military families to seek DoD housing may make it impossible for DoD to reduce the number of units in its inventory. This chapter focuses on options that would change those incentives and thus permit the department to increase its reliance on private-sector housing.

The first two options this chapter considers, Options 3 and 4, change incentives but remain within the boundaries of the current system in that the price paid for DoD housing is the forgone housing allowance. Option 3 reduces the demand for DoD housing through a general increase in housing allowances, which is offset by a cut in basic pay that holds the total after-tax cash compensation of military personnel at its present level. Option 4 shifts housing allowances away from low-cost areas and toward high-cost ones to reduce the demand for DoD housing in high-cost locations, which experience the greatest pressure for additional housing.

Option 5 fundamentally realigns incentives, disconnecting the housing allowance from the price military personnel pay for DoD housing. Under that approach, DoD would pay housing allowances to all military families and charge those families who choose to live in DoD housing for their rent and utilities. Conceptually, the rental approach offers the greatest potential for reducing costs while maintaining the quality of life of military personnel. But because it represents the greatest change from the current system, its imple-

mentation now could add to the uncertainties that military families face during the transition from the Cold War era.

Option 3: Raise Allowances and Cut Basic Pay

This option would provide better incentives for choosing between private-sector and DoD housing by raising the levels of housing allowances for military personnel with dependents and thus, in effect, increasing the price families pay for DoD housing. Because the option assumes that military compensation for the armed forces as a whole is already at the desired level, total after-tax compensation provided to military personnel under this approach would be held constant by reducing basic pay.¹ The total amount of the reduction would be equal, after taxes, to the increase in housing allowances.

Although the after-tax compensation paid by DoD would be unchanged, families who live in DoD housing and military personnel without dependents would receive less (because of the cut in basic pay). Families who live in the private sector, however, would find their decrease in basic pay more than offset by the increase in their housing allowances.

1. For each decrease of one dollar in taxable compensation, DoD would increase allowances by 85 cents (the after-tax value of a dollar of military pay). To offset the tax loss to the Treasury and hold the federal deficit constant, 15 cents would be taken from DoD's budget authority.

Under this option, waiting lists for DoD family housing should diminish in response to the higher prices service members would pay for that housing. If allowances were set at a sufficiently high level, most installations would have a surplus of DoD housing rather than unmet demand. Base commanders and service members would no longer equate additional on-base housing with an improved quality of life, and DoD would be free to reduce its role in providing housing. Over the long run, this option could, by itself, reduce DoD's inventory of family housing and the associated costs. To ensure a more immediate effect on inventories and costs, this "demand-side" policy option could be combined with a "supply-side" approach (such as Options 1 or 2) that mandates a reduction in DoD's stock of housing.

By How Much Should Allowances Be Increased?

To level the playing field between DoD and the private sector completely and thus provide the best incentives, the price military personnel pay for DoD housing should equal the cost to the federal government of providing that housing. As long as military families pay less than the full cost, some families will choose DoD units even though the value of the unit to the family does not justify the costs that the federal government incurs in providing it. A further argument for raising the price of DoD housing to equal its cost is that it would treat families who live in private-sector housing more equitably because they already pay a price that covers the full cost of their housing.

It may not be practical, however, to level the playing field completely. Currently, families who live on-base give up a housing allowance with an average annual value of \$7,500 to live in a unit that costs the federal government \$12,500 annually. DoD would have to increase the average annual allowance for personnel with dependents by \$5,000 (a 67 percent increase) to make the price service



Private-sector housing near Ft. Belvoir, Virginia. Raising allowances would encourage more military families to rent or buy in the private sector. (U.S. Army photo by Mark Ray)

members pay for DoD family housing equal to the cost of that housing. An increase of that size would result in what many would consider an unacceptable discrepancy between the total compensation paid to personnel with and without dependents.

Yet even a smaller increase in allowances for personnel with dependents—for example, 20 percent—would improve the incentives for military families to opt for housing in the private sector and permit some reductions in DoD's housing inventories. (If the demand for DoD housing among military families is responsive to changes in price, the reductions in inventory and accompanying savings made possible by such an increase in allowances might be similar to those outlined under Option 2.) If allowances were increased 20 percent, total after-tax compensation for military personnel (which would otherwise rise in response to the higher allowance levels) could be held constant by reducing basic pay and related compensation for all personnel by approximately \$1.1 billion, or 2 percent.²

2. This calculation assumes that accrual charges for military retirement and other elements of compensation that are tied by law to basic pay would decline with the cut in basic pay.

What Are the Advantages and Disadvantages of the Option?

This option offers several advantages in that it attacks the incentive problems that foster reliance on DoD housing and treats families living in private-sector housing with greater equity relative to families living in DoD housing. When combined with mandated reductions in inventory (such as those proposed in Options 1 or 2), this option offers immediate savings in costs for revitalizing and replacing DoD units.

Yet the option also has important disadvantages as well. The current difference between housing allowance rates for married and single personnel is already a source of concern among single service members.³ Therefore, even a small increase in housing allowances for personnel with dependents would probably be viewed as inequitable. Another disadvantage is that any shift in compensation away from basic pay and toward housing allowances for families in the United States might result in lower rates of retention for the force as a whole. (Many experts consider basic pay, which is provided to all personnel regardless of dependency status, one of DoD's most cost-effective compensation tools.) A further issue is that an increase in allowances sufficient to eliminate the demand for DoD housing at installations at which waiting lists are now relatively short could still leave a large number of families seeking DoD housing at those installations that currently have long waits.

3. See, for example, Tom Philpott, "Unequal Pay: Members Sound Off," *Air Force Times*, April 12, 1993.

4. For example, the commander of the Naval Facilities Engineering Command, in his April 1993 testimony before the House Committee on Armed Services, Subcommittee on Military Installations and Facilities, noted that the Navy's most pressing housing problem is a 12,000-unit shortage in the high-cost San Diego area.

Option 4: Reallocate Allowances from Low-Cost to High-Cost Areas

DoD housing managers and compensation experts are particularly concerned about the ability of military personnel to afford private-sector housing in high-cost urban areas.⁴ The pressure those managers feel to provide more DoD-owned or DoD-leased housing in such areas is one indication that the current system of variable housing allowances is not adequate to compensate personnel for differences in the price of housing in different regions. In many cases, DoD housing is offered as the only alternative to inadequate allowances.

Option 4 would increase the regional differentials in housing allowances by lowering allowances in low-cost areas and raising them in high-cost ones. Because it would, in effect, raise the price that military families pay for on-base housing in high-cost areas, this alternative would reduce both waiting lists and the pressure to provide DoD housing in areas in which the need for it is seen as greatest. Unlike Option 3, this option does not change the average level of housing allowances paid to military families and consequently does not aggravate the existing discrepancy between the cash compensation received by single and married service members.

Under this option, the variable housing allowance and the basic allowance for quarters would be integrated into a single allowance that reflected the local cost of obtaining a "standard-quality" housing unit. The standard-quality unit for each paygrade would be based on the national median quality of housing obtained by service members in that paygrade. For example, because the families of E4s across the nation typically spend enough to obtain a two-bedroom apartment, that size unit would be considered standard quality for an E4 with dependents.

Table 6.
Percentage Distribution of Housing
Allowances Among High- and Low-Cost
Housing Markets, 1991

Housing Market Quartile	Current System	Option 4 System
Highest-Cost Quartile	38	43
Second Highest Cost Quartile	28	28
Third Highest Cost Quartile	15	14
Lowest-Cost Quartile	19	15
Total	100	100

SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: The local housing market for each Department of Defense (DoD) unit was identified using DoD's definition of a military housing area: all housing within 30 miles or a 60-minute commute (one way) of a military installation.

DoD would set the out-of-pocket cost under this option so that the total cost of the new allowance system equaled the cost of the old. According to CBO's estimates, an out-of-pocket cost equal to 22 percent of the national median cost of a standard-quality unit would maintain the total cost of allowances at their current level (see Appendix E for details). Under this option, then, allowances for an E4 with dependents stationed in any area of the country would equal the local cost of a two-bedroom apartment (the E4 standard-quality unit) less 22 percent of the national median cost of a two-bedroom apartment. This option is similar to the price-based housing allowance that was recommended for study by the Seventh Quadrennial Review of Military Compensation.⁵

The average allowance DoD pays to individuals in different paygrades would not change significantly under this option, but the allocation of allowances by location would change.

The percentage of all allowances that goes to the military housing areas with the highest rental costs, based on the Department of Housing and Urban Development's fair market rents for two-bedroom units, would rise from 38 percent to 43 percent under the new system (see Table 6). At the same time, the percentage of all allowances going to the military housing areas with the lowest fair market rents would fall from 19 percent to 15 percent.

What Are the Cost Implications of the Option?

Although the new allowance system would, by design, cost the same amount as the current allowance system, some savings would develop over the long run. Increasing housing allowances in high-cost areas would reduce the demand for additional DoD housing there, eventually permitting DoD to rely on less costly housing in the private sector. However, the effect of the new system on DoD's costs would be indirect: first, the higher allowances must reduce the demand for DoD housing, and then DoD housing managers must respond to the reduced demand. As a result, the probable long-run savings are difficult to estimate, and significant savings in the short term are unlikely.

For the same total expenditure in military compensation, the levels of retention and morale of military personnel are likely to be higher under a system in which adequate regional variations in compensation offset the fluctuation in purchasing power that is otherwise associated with being assigned to a high-cost area. Consequently, it may be possible to reduce pay raises slightly in the future. Again, however, the magnitude of the effect of more equitable regional variations in compensation is difficult to estimate.

What Are the Advantages and Disadvantages of the Option?

In addition to the potential for long-run savings, this alternative system of regional hous-

5. Department of Defense, *Report of the Seventh Quadrennial Review of Military Compensation* (August 21, 1992), p. 78.

ing allowances would be fairer than the current system to families living in high- and low-cost areas of the country. As Chapter 2 notes, military families in locations in which the price of housing is high hold down their expenditures by purchasing less housing (in the form of smaller or lower-quality units). Because the current VHA system bases the levels of allowances in a region on local expenditures by military personnel, allowances in high-cost locations reflect the cost of lower-quality units. Consequently, under the current system, the out-of-pocket cost of renting a standard-quality apartment is greater in high-cost locations than in low-cost ones because personnel must make up the difference in cost between the lower-quality and the standard-quality unit. Under the housing allowance system proposed in this option, the out-of-pocket cost of renting a standard-quality unit would be the same in both high- and low-cost locations.

A fairer system that provides adequate compensation for families in high-cost areas--even if it does not automatically reduce the demand for on-base housing--may be a necessary first step before DoD can attempt any more far-reaching reform of its military family housing system. Neither a large, mandated reduction in DoD housing inventories, such as that outlined under Option 2, nor the introduction of a rental system (see Option 5) would appear appropriate in high-cost areas unless the families living in those locations received allowances that put them on an equal footing with families in low-cost regions.

One disadvantage of this option is that it could contribute to the demand for revitalizing or replacing DoD housing in relatively low-cost areas in which housing allowances would be reduced. As a result, there might be little change in DoD's role as a provider of housing or in the costs of that housing in the long run. Moreover, in the short run, DoD would incur some costs in setting up the new housing allowance system. In addition to determining the quality standards for each paygrade, DoD would need to develop data on the price of housing for each military housing area. The

Department of Housing and Urban Development and the Bureau of Labor Statistics maintain indexes of housing costs, but those measures do not cover all military housing areas adequately. Although either agency might be able to develop and maintain appropriate data on regional prices for DoD, they would require some additional funding for that task. Another requirement for the new system of allowances would be a gradual phase-in to moderate the system's adverse impact on service members living in low-cost areas in which the levels of allowances would fall.

Option 5: Institute a Rental Market Within DoD

Under the current system, in which the price paid for DoD housing is the forgone housing allowance, changes in the levels of allowances are the principal tool DoD has for controlling the demand for its units. But such a tool is expensive. When DoD increases allowances, it must increase them for all families who live in the private sector, not just those families who would otherwise have preferred DoD housing. It is also a crude method in that waiting lines for desirable units can coexist with vacancies in less desirable units. In addition, conflicts can arise over what is desirable from the perspective of compensation and what is desirable from the perspective of price. For example, an increase in allowances that raises the price paid for DoD family housing will increase the disparity in compensation between single and married personnel.

This final option addresses the problem of incentives by separating housing allowances from the price of DoD housing. Under this approach, DoD would pay tax-free housing allowances to all military families, both those who live in DoD family housing and those who live in housing in the private sector. (If housing allowances were to be taxed, an increase in basic pay equal to the lost tax advantage--and

a matching increase in total DoD funding--would be needed to avoid a gain to the Treasury at DoD's expense.)

Families who chose to live in DoD housing would pay rent to DoD as well as the cost of their utilities. DoD would set rental prices and operate its housing in a manner similar to the operations of a private-sector provider. Rents for each type of unit at each installation would be set at levels that would eliminate waiting lists and limit vacancies to only very brief periods. DoD would continue to operate its existing units as long as the rent (the value of the unit to service members) exceeded the cost of operating the units and as long as DoD's minimum standards for quality were met. Aging units would be revitalized or replaced only if the anticipated rental income exceeded DoD's total costs for the unit (including its amortized capital costs).

The waiting lists that exist for most DoD housing indicate that the level of rent necessary to eliminate them is, in most cases, higher than the current levels of allowances. The intent of this option is to maintain the quality of military life, not increase the out-of-pocket costs of military personnel. Thus, any difference between DoD's total rent and utility receipts and the cost of providing housing allowances to families living in DoD housing would be used to finance an increase in allowance levels for all military families.

How Much Would the Option Save?

A rental system would lead to some savings for the federal government because it would provide both DoD tenants and housing managers with incentives to reduce the cost of providing DoD housing units. Utility costs are one area in which such savings are likely. Rather than add the average cost of utilities onto the rent that it charged, DoD could install meters in each unit and charge tenants based on what they actually use. Experience in the private sector indicates that charging tenants for their utilities reduces usage by ap-

proximately 20 percent (see Chapter 2). Such a reduction could save approximately \$300 per DoD unit each year (\$90 million annually at DoD's current level of inventory). Under a rental system, the potential for those savings would make individual meters attractive both to DoD housing managers and to the families who live in DoD housing. Moreover, because units with energy-efficient features would command a higher rent than other units, charging tenants based on their actual use of utilities would not be unfair to those living in less efficient units.

This option would produce additional savings by reducing the rate of turnover in DoD units. If waiting lists were eliminated, families who chose DoD housing would move into it directly rather than live in the private sector for part of their tour. The costs of the between-occupancy maintenance associated with turnovers would therefore fall. In addition, DoD would no longer need to fund local "courtesy moves" for families moving into DoD housing from the private sector.

Other savings would be realized because DoD would gradually reduce its housing inventory in locations in which the value to service members of on-base units (measured by the rent the units commanded) was less than the cost to the federal government of providing the housing. The resulting savings would depend on how fast and how much of the inventory would be reduced. For purposes of illustration, CBO assumed that existing units would continue to be operated until DoD needed to invest in revitalizing or replacing them. It further assumed that the rents that could be charged would justify replacing or revitalizing 25 percent of the existing units as they reached the age at which such investment was needed.

This last assumption probably overstates the percentage of units that DoD would maintain in the long run and thus understates the savings from this option. The long-run average annual cost of a DoD unit to the federal government is \$12,500--about 35 percent more than service members choose to pay for hous-

ing in the private sector. Even if DoD housing were considered quite desirable, few military families would be likely to feel that they could afford to pay a 35 percent premium to obtain it. (For example, only 9 percent of the families of E5 and E6 personnel who obtain housing in the private sector choose to spend 35 percent or more above the median expenditure for their paygrade and location.)

If 25 percent of the DoD units reaching the age when they needed revitalizing or replacing were retained under a rental system, the level of the DoD housing inventory in 1999 would be 21 percent below the current DoD plan, the same reduction achieved under Option 2. But federal savings would be somewhat greater under the rental option because

Table 7.
Average Annual Savings If DoD Housing Is Provided on a Rental Basis
(In millions of 1993 dollars)

Category	1994-1999	2000-2014
Military Construction	640	620
Family Housing Operations and Maintenance	300	780
Housing Allowances Less Receipts ^a	-230	-960
School Impact Aid ^b	50	200
Total	760	640

SOURCE: Congressional Budget Office based on data from the Departments of Defense and Education.

NOTES: These figures represent undiscounted savings by the federal government relative to a fully funded DoD plan.

DoD = Department of Defense.

- a. The additional cost of allowances less receipts from rents and utility charges. These estimates take into account the cost of raising allowance levels to hold constant the total out-of-pocket cost borne by military families for housing.
- b. The Department of Education pays Impact Aid to local governments based on the number of school-age dependents of federal employees. The payments made on behalf of dependents who live on federal land (in housing that is not subject to local property taxes) are higher than the payments for those who live in private-sector housing. These estimates are the net savings in Impact Aid that result from shifting families from DoD to private-sector housing.

of the reduced costs for utilities. Assuming a gradual phase-in of the rental system as DoD units turned over, annual savings relative to a fully funded DoD plan would average approximately \$760 million between 1994 and 1999 (see Table 7).

That estimate takes into account the cost of providing housing allowances to all military families and the cost of raising the level of allowance payments so that the total out-of-pocket cost incurred by service members is the same as it would be under the DoD plan. Thus, the estimate of savings does not reflect dollars taken from the pockets of military personnel. In addition, the savings estimate is not affected by the amount of the rental payments DoD would receive because all rents in excess of the cost of paying allowances to those living in DoD housing would be returned to the entire force in the form of higher allowance levels.

If DoD's housing inventory decreased gradually--and permanently--to 25 percent of the level currently planned, the total of all savings from the rental option would be approximately \$16 billion. (This estimate is discounted to take account of the value of money over time.) Approximately \$1 billion of the discounted savings would come from savings in utilities. Reducing the DoD inventory would account for the other \$15 billion, as it did under Option 2. Expressed in annualized terms, savings from the rental option would have the same value as a savings stream of \$480 million a year in perpetuity.

What Are the Advantages of the Option?

Although budgetary savings are an important advantage of this option, the rental market approach offers a number of other substantial benefits. For instance, it ensures that the number, type, and location of DoD units reflect what military personnel want in such housing. Because rental prices for the units would signal their value to service members,

DoD would have a clear guide to follow in making decisions about its aging housing stock. The criterion for revitalization, replacement, and new construction would be that the value of the unit to service members must equal or exceed the cost to the federal government of providing the unit. That criterion would permit DoD to offer housing wherever it was a cost-effective benefit for military families and not just in locations in which housing was unavailable in the private sector. The total number of DoD units would probably decline significantly, though gradually, under a rental system. However, more DoD units might be located in areas in which private-sector housing met DoD's formal criteria for acceptability but was simply less desirable than DoD housing in the eyes of service members.

Another advantage comes from eliminating waiting lists. Under a rental system, families moving to new locations would be able to compare the rental costs of DoD units and private-sector housing and then settle directly into the type of housing they had selected, without undergoing the uncertainty and stress associated with waiting lists and double moves. Moreover, under a rental system, DoD housing would be available to those military families that placed the highest value on it, rather than those at the top of a waiting list.

The rental approach might also be more equitable than the current system based on waiting lists. All families in the same paygrade would receive the same allowances and face the same choices. The extra benefit currently reaped by families living in DoD housing (the difference between the housing allowances they forgo and the rental value of the DoD unit) would be redistributed to all military families in the form of higher allowances. In addition, a rental system would free DoD to set housing allowances based on considerations of equity and retention, without having to consider the impact on the demand for DoD housing. Indeed, adopting a rental approach for DoD housing may be a necessary first step in simplifying today's complex system of compensation for military personnel.

What Are the Disadvantages of the Option?

A far-reaching change such as a shift to a rental system would entail some disadvantages. Among them are the one-time costs and risks associated with shifting to the new system, including the cost of determining the initial rent levels. DoD's intent would be to set rent levels to avoid both waiting lists and excess vacancies. Initially, however, expert judgment would be needed to estimate those levels, taking into account the length of current waiting lists and the cost of comparable housing in the private sector. Some errors would be inevitable, and adjustments in rents would then be necessary if persistent waiting lists or vacancies developed. Fortunately, DoD housing is usually constructed and revitalized in blocks of between 100 and 300 similar units; DoD thus could set initial rents without evaluating each housing unit individually.

Another one-time cost would be the development of a system for collecting rents, possibly as an extension of the current pay system in which families who live in DoD housing automatically forfeit their housing allowances. Other one-time costs would be associated with purchasing and installing utility meters in most units. (DoD units currently do not have individual utility meters, although meter connections, or "drops," are included in all newly built or recently renovated units.)

In addition to these transition costs, DoD could encounter problems in applying the rental approach to particular housing units, groups of personnel, or locations. For example, it appears that DoD now provides housing in high-cost areas of the country in part to compensate for the lack of adequate regional differentials in compensation. Under a rental system, DoD housing could no longer serve that role. Until the department adopts a system that allows for greater regional variations in military compensation (possibly through a revised VHA), that limitation must count as a disadvantage of the rental approach in high-cost locations.

Yet even with greater regional variations in compensation, junior personnel with large numbers of dependents might find that their total family income (including housing allowances) did not allow them to afford either private-sector or DoD housing. Because of their mobility, military families with low incomes have difficulty gaining access to programs of housing assistance that are open to civilian families in some localities. To address this problem, it might be desirable to reserve some units in the DoD housing inventory for junior personnel with large families--even if the rental receipts from those units did not cover their full cost to DoD. The cost of this subsidy to low-income families would be clearly indicated in the DoD budget as the difference between the cost of the housing units and the rental receipts.

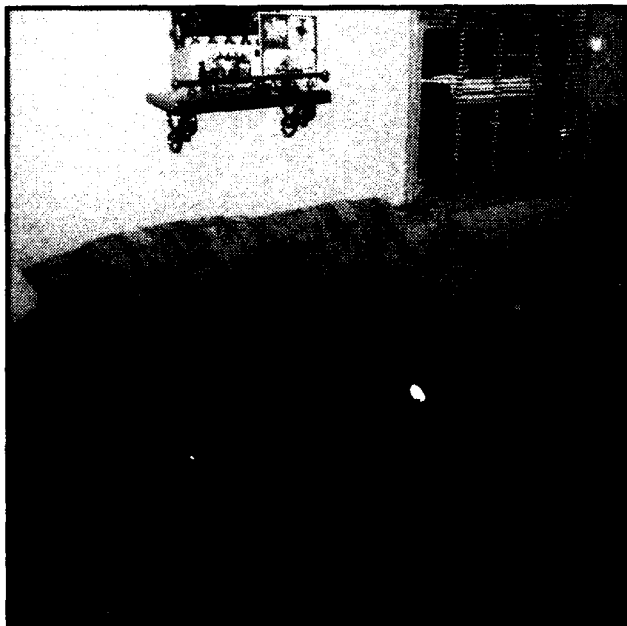
A rental system could also pose problems for senior military personnel with command responsibilities and others who are required to live on-base. Currently, the requirement to live on-base in specially designated housing units frequently matches the desires of those "key and essential" personnel. But under a rental system, many senior personnel in command positions might prefer to live in private-

sector housing rather than pay the rental cost of a DoD unit. Because only an estimated 3 percent of DoD units are currently designated for such personnel, it might be possible simply to restrict rents on those units to ensure that on-base residence was not a hardship for those service members.

DoD units with historic value might also present difficulties. The department currently owns and operates approximately 10,000 units that were built before 1940. (Many but not all of the units are attractive officer quarters designated for key and essential personnel.) The units are unlikely to be rented to military personnel at a sufficiently high rate to cover the costs of their operation and maintenance. Nonetheless, a rental approach could still prove useful for those units that are not occupied by key and essential personnel: the difference between the rent paid and the cost of operations could be clearly identified as the cost of maintaining a historic building.

Dealing with these special cases could require a rental system with some flexibility. Still, only a small percentage of DoD's current inventory is of historic value or is occupied by junior enlisted personnel or key and essential personnel. A more fundamental concern with the rental approach is whether it could--or would--be put into place without producing a real or perceived decline in the quality of military life. This study describes a rental option in which DoD would increase allowance levels to hold constant the total out-of-pocket housing costs that service members must pay. In practice, however, DoD could institute a rental system without any increase in allowance levels for the force as a whole. And even if allowances did rise, service members might still view the rental charges as an erosion of a traditional benefit at a time when the post-Cold War reductions of personnel have already shaken their confidence.

The rental approach, with its emphasis on the value of DoD units to service members, may also fail to take into account the possibility that DoD should value and encourage military communities for their own sake, as an in-



Maintaining the quality of life of military families is a central concern for DoD decisionmakers. (Photo by Bill Burgess, Ft. Bragg Family Housing Office)

tegral part of the military life-style. Conceptually, that objection might be overcome by allowing DoD to request funds to subsidize on-base communities in locations in which rents would not cover the full cost of the units. As a practical matter, however, those who feel that military communities should be protected may also feel that it is easier to do so under the current system, in which the value of DoD family housing to service members cannot readily be compared with DoD costs.

These disadvantages are important, but they must be weighed against the key benefit

of a rental system. More than the other approaches in this study, such a system would provide DoD with clear signals about the housing preferences of military personnel and allow those preferences to shape its decisions about family housing. On the one hand, those signals would permit DoD to provide family housing in locations in which the value of the units to service members exceeded the costs to DoD. On the other hand, they would discourage DoD from providing housing in locations in which the cost of DoD housing exceeded the value of the units to military personnel.

Appendixes

Location of DoD Housing in the United States: A Statistical Analysis

The number of Department of Defense housing units located in the different military housing areas in the United States varies widely. The statistical analysis presented in this appendix suggests that most of that variation can be explained in terms of the number of military families in the MHA, the cost of private-sector housing there, and the size of the civilian housing market. MHAs with a comparatively larger number of military families have a larger number of DoD family housing units, as do MHAs in which the cost of civilian housing is high. MHAs with a large civilian housing market have a smaller number of DoD units.

To arrive at those conclusions, the Congressional Budget Office conducted a regression

analysis based on cross-sectional data for more than 300 MHAs (see Table A-1). The dependent variable in the regression, DOD UNITS, is the natural log of the number of DoD family housing units in the MHA. The independent variables, in addition to a constant term, are the log of the number of military families living in the MHA (MIL FAM), the Department of Housing and Urban Development's estimate of the fair market rent for the MHA (FMR), and the log of the number of private-sector units in the MHA occupied by civilian families (CIV UNITS). Together, these independent variables explain 74 percent of the variation in the dependent variable. All of the estimated coefficients are significantly greater than zero and have the expected signs; the standardized coefficients, however, indicate

Table A-1.
Regression Analysis to Explain the Location of DoD Housing Units

Independent Variable	Parameter Estimate	T Statistic	Standardized Parameter Estimate
Intercept	-7.03	-2.56	0
MIL FAM	1.99	30.67	.94
FMR	1.86	4.03	.12
CIV UNITS	-1.20	-11.79	-.38

SOURCE: Congressional Budget Office.

NOTES: The dependent variable in the analysis was DOD UNITS. Observations totaled 331, and the adjusted R-square was .74.

DoD = Department of Defense.

Table A-2.
Regression Analysis to Explain Access to DoD Housing

Independent Variable	Parameter Estimate	T Statistic	Standardized Parameter Estimate
Intercept	38.23	3.58	0
CIV AVAIL	-0.03	-6.98	-.36
FMR	0.02	0.83	.04

SOURCE: Congressional Budget Office.

NOTES: The dependent variable in the analysis was DOD ACCESS. Observations totaled 331, and the adjusted R-square was .12.

DoD = Department of Defense.

that the number of military families (MIL FAM) is the most important factor determining the number of DoD housing units. In other words, DoD puts its family housing where its military families are located.

The rate of access to DoD housing in an MHA is measured not by the number of DoD units but by the ratio of DoD family housing units to military families living in the MHA. Similarly, the availability of civilian housing might be measured by the ratio of civilian units to military families. To what degree does the rate of access to DoD housing depend on the availability of civilian housing and its price?

To answer that question, CBO performed another regression analysis in which the log of the rate of access (DOD ACCESS) is the dependent variable and the independent variables are the log of the ratio of civilian units to military families (CIV AVAIL) and the FMR (see Table A-2). These results confirm the

view that DoD provides less access to its housing in locations in which civilian housing is more available, but they do not indicate that DoD provides more access to its housing in areas in which private-sector costs are high. The coefficient for the FMR is not statistically significant.

In addition, local prices and the availability of civilian housing do not explain much of the variation in access to DoD housing. Only 12 percent of the variation in the dependent variable is accounted for in the regression. Either the degree of access varies among MHAs in a way that is largely random, or it is determined by factors omitted from this regression. One possibility that was not investigated in this study is that access to DoD housing today is greatest in those MHAs that had a large number of families stationed there during the early years of the Cold War (when most of DoD's existing housing was built) relative to the number of families today.

A Supply and Demand Framework for Local Housing Markets

It is more cost-effective for the Department of Defense to provide cash compensation than to provide housing in locations in which the cost of DoD housing exceeds the cost of housing in the private sector that military personnel view as equal in value. Such a strategy may be difficult to implement, however, because it could require DoD to increase housing allowance rates dramatically or adopt a rental system for its housing units.

The discussion in this appendix makes certain assumptions. First, it assumes that the current allowance system is unchanged. Second, it assumes that DoD will ensure that all military families have access to affordable housing by providing housing in locations in which the cost of housing in the private sector exceeds DoD's maximum allowable housing cost. Within that context, the appendix examines how the methodology used by DoD to determine how much housing it must provide differs from standard economic analyses.

Basic economic theory offers the kind of analysis needed to determine the extent to which the private sector can provide housing in a local housing market (see Figure B-1). The civilian demand curve indicates the quantity of housing in the private sector that civilian households demand at different prices. Demand is less when prices are high because fewer families choose to live in the market area and those who do purchase less housing (in the form of smaller or less attractive units). The total demand curve in Figure B-1 (the sum of civilian and military demand) assumes

that no DoD housing is available and that all military families in the area must live in the private sector.

The supply curve shows the total number of private-sector housing units available in the market area at different prices. Supply is greater at higher prices because the opportunity to make a profit encourages both new construction and improvements in the existing housing stock.

This kind of supply and demand analysis might be used to identify how much housing DoD should provide. As Figure B-1 is drawn, P_e , the equilibrium price of private-sector housing when all military families live in the private sector, is greater than the MAHC. AB is the number of military families that the private sector can accommodate without driving the price of housing higher than the MAHC. BC is thus the requirement for DoD housing: the total number of military families less those that the private sector can accommodate at an affordable price.

In this conventional economic analysis, nothing predetermines the share of the private sector that is available to military families; it varies depending on the maximum price for housing that DoD deems affordable (that is, the MAHC) as well as on the way in which civilian demand and the civilian housing supply respond to changes in prices. Unlike the DoD methodology, this kind of supply and demand framework allows for the construction of new units in response to military

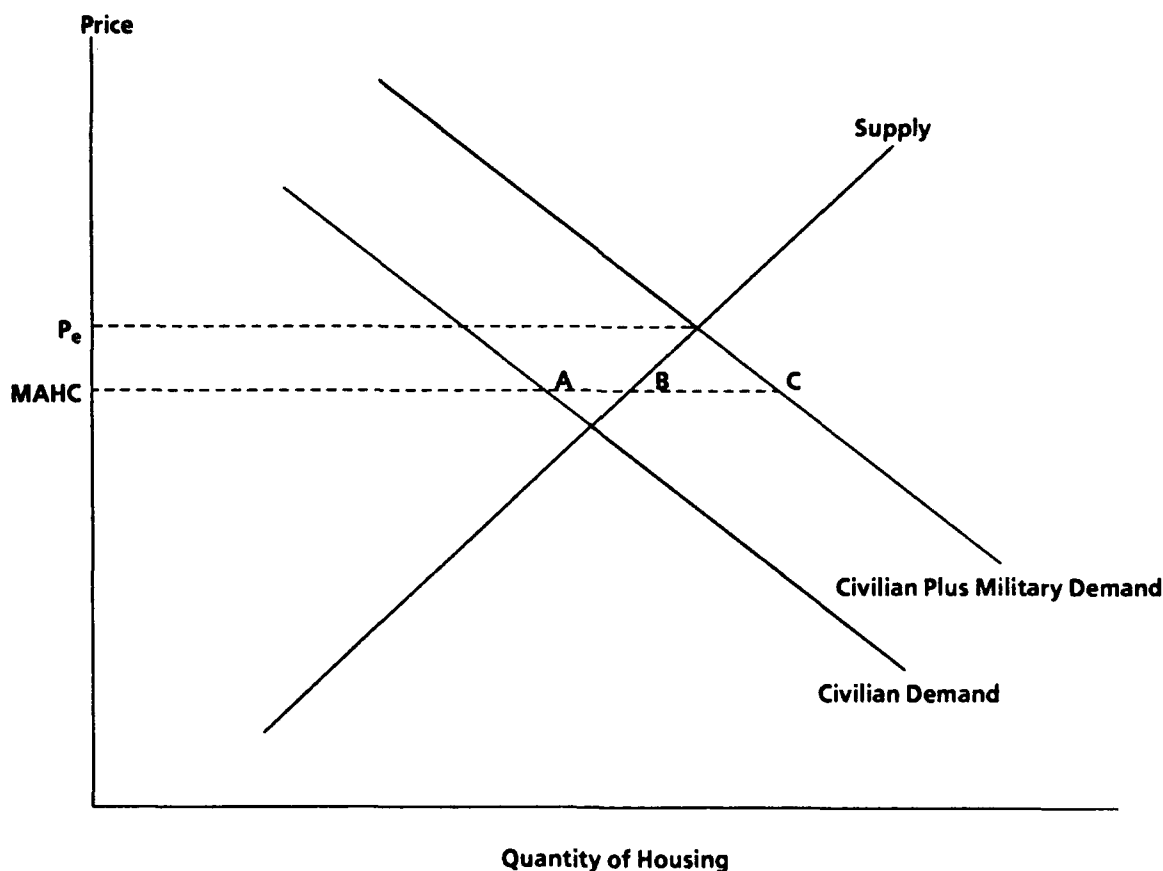
demand and for possible decreases in the number of existing units that are occupied by civilian households as a result of the pressure of military demand.

This framework is useful for identifying the weaknesses of the DoD approach based on current market shares. At the same time, however, it raises some serious questions about the feasibility of estimating the number of affordable units in the private sector (either overall or, as required by DoD market analyses, by numbers of bedrooms) that will be available in five to seven years. In the short run, the supply of housing in many markets is relatively inelastic (that is, the supply line would be somewhat vertical), and shifts in to-

tal demand can result in disproportionate, albeit temporary, price swings. Because of this cyclical quality, estimating the conditions that will prevail in the housing market of a particular area over the next several years may be both impractical and, in terms of DoD's long-run housing needs, irrelevant.

Over the long run, analysts believe that the supply of housing in most U.S. markets will be quite elastic (the supply line would be relatively horizontal) and priced to reflect the underlying cost of providing housing in a given area. DoD thus might find it more useful to focus its market studies on underlying, long-run conditions rather than try to estimate the prevailing cyclical conditions in five to seven

Figure B-1.
Supply and Demand for Private Housing



SOURCE: Congressional Budget Office.

NOTES: P_e = equilibrium price if no on-base housing is available; MAHC = maximum allowable housing cost determined by the Department of Defense (DoD); AB = number of private-sector housing units available to military families when price equals the MAHC; BC = minimum number of DoD units required if the price of private-sector housing is not to exceed the MAHC

years. It might also consider whether any special circumstances in specific local housing markets might keep those markets from expanding to meet the needs of military personnel.

This approach could provide a justification for DoD housing in several kinds of situations. For example, it could justify DoD's providing housing in locations with zoning restrictions, limits on the availability of land, or rent controls. In addition, DoD housing might be justified in locations in which long-run housing prices are expected to remain well above the national median. But such a justification would only be valid under the current housing allowance system, in which housing allowances (and thus maximum allowable housing costs) are based on expenditures and only im-

perfectly linked to prices. Under a housing allowance system based on the price of housing--such as that outlined in Option 4--areas with higher housing prices would have correspondingly higher allowances. As a result, high prices in the private sector would no longer mean a shortage of affordable housing for military personnel.

At the same time, this approach might rule out replacing or revitalizing DoD units in most locations across the country. Those areas would be characterized by housing prices that over the long run are not far above the national median; by the presence of a large, well-established civilian housing market; and by no obvious limits on the ability of the private sector to respond to shifts in the demand for housing by increasing supply.

CBO's Inventory Model and Its Costing Methodology

The Congressional Budget Office used a spreadsheet-based computer model to estimate the future funding that the Department of Defense requires for revitalizing and replacing units in its family housing system. This appendix describes the assumptions made and the calculations used in that model. It also provides detailed information about the comparison between the average annual cost of DoD housing and units in the private sector shown in Figure 6 (see page 18), describes how CBO estimated the present discounted value of decisions about housing inventories (see Box 1 on page 20), and discusses the discount rate assumed in this study.

Estimating Future Requirements

To produce its estimates, CBO first projected the number of units that DoD needs to revitalize and replace each year by estimating the future size and distribution by age of DoD's housing stock in the United States. It then applied assumptions about the age at which units needed to be revitalized or replaced. These projections identify only new requirements (units reaching the age at which it is assumed they need to be replaced or revitalized); they do not identify possible backlogs of unmet requirements.

Each of the services provided CBO with data on the size and age distribution of its stock of family housing in 1991. CBO then subtracted the units that DoD expects to lose from the base closures announced in 1989 and 1991 (assuming that those units have the same age distribution as the rest of the DoD inventory) and "aged" the remaining inventory. (The estimates of future inventories do not take into account possible additions to the stock of DoD housing, which would not contribute to requirements for revitalization or replacement for at least 30 years.)

CBO calculated the number of units that need to be revitalized each year from 1994 through 2014 based on the projected inventories and on the assumption that DoD units constructed after 1940 should be revitalized at between 30 and 40 years of age. (The analysis used a uniform distribution: 10 percent of the inventory was assumed to need revitalization at 30 years of age, another 10 percent at 31 years, and so on.) CBO then estimated the number of units built after 1940 that needed replacing based on the assumption that units should be replaced 20 to 25 years after they have been revitalized. Together, these assumptions imply that DoD units have a total service life, on average, of 57.5 years.

Units built prior to 1940--which may have historical value and are likely to remain in DoD's housing inventories indefinitely--account for about 3 percent of the DoD housing stock. CBO assumed a 20-year revitalization

schedule for those units, with 5 percent of them reaching the revitalization point each year.

Next, CBO converted these projections to requirements for funding (see Figure 7 on page 26), using the assumption that it costs DoD \$100,000 to replace a unit and \$60,000 to revitalize it. Because CBO derived these estimates of required funding from the projected numbers of units reaching the age at which revitalization or replacement would be needed, the estimates do not capture possible backlogs of unmet needs.

CBO's analysis clearly indicates that the level of funding required during the next three decades for revitalizing and replacing DoD housing in the United States will remain well above the levels seen before 1980. Alternative assumptions about service lives and revitalization policies, however, could shift the profile of funding requirements somewhat.

Comparing the Annual Long-Run Costs of DoD and Private-Sector Housing

CBO derived an estimate of the average annual cost of DoD units in the United States and an estimate of the average amount that families living in those DoD units would spend if they chose to live in the private sector (see Figure 6 on page 18). Each of these estimates has several components.

Average Annual Cost of DoD Units

The average cost for operating and maintaining DoD units in the United States was based on the number of DoD-owned units in 1991 and on operations and maintenance costs for

DoD family housing in the United States (excluding the cost of leases) in that year. The costs were inflated to 1993 dollars.

CBO based its estimate of the amortized cost of capital for DoD units on the following assumptions: an average DoD unit is constructed at an initial cost of \$100,000; it is revitalized when it reaches 35 years of age at an additional cost of \$60,000; and it is retired, on average, 22.5 years later. (These assumptions are used throughout this study and are consistent with estimates provided by DoD.) Using a real discount rate of 3 percent, the present discounted value of these life-cycle capital costs is \$120,000. The amortized cost of capital for DoD units--approximately \$4,400--is that present discounted value amortized, or spread out (using the 3 percent annual interest rate), over the entire 57.5-year life of the unit.

CBO's estimate of federal Impact Aid is the average annual Impact Aid paid for a family living in a DoD unit (\$2,000) less the amount of aid that would be paid if the family lived in the private sector (\$100). CBO calculated the average annual payment for families living in DoD units by dividing the total type "A" payments for 1993 by the number of families living in DoD housing. (Type "A" payments are those made by the Department of Education on behalf of the dependents of military personnel who both live and work on federal land.) CBO estimated the number of children per DoD unit by dividing the average annual payment for families in DoD units by the Department of Education's estimate of the average type "A" payment per child. It then determined the cost of the type "B" payments (payments for the dependents of military personnel who live in the private sector) that would be paid if a family moved from DoD housing to private-sector housing. The Department of Education's estimate of average "B" payments per child in 1993 was used, together with CBO's estimate of the number of children per DoD housing unit.

The annual carrying cost of land for DoD units was estimated based on a 3 percent in-

terest rate and the assumption that the land for a housing unit costing DoD \$100,000 to build would have a market value of \$15,000.

Costs in the Private Sector

CBO's estimate of how much, on average, families living in DoD housing would choose to spend if they lived in the private sector reflects what military families (in the same paygrades and locations as the families in DoD housing) typically spend to obtain private-sector housing. DoD uses an annual survey to determine housing allowance rates and median out-of-pocket costs by paygrade and location for military families currently living in the private sector. The level of the allowance and the out-of-pocket costs shown in Figure 6 (see page 18) are weighted averages of those numbers; the weights reflect the distribution of DoD housing units by paygrade and location. In effect, this approach assumes that an E6 with dependents living in DoD housing in a particular location would spend the same amount on housing in the private sector as the typical E6 with dependents in that location who currently lives in private-sector housing.

Savings from Retiring Rather Than Replacing or Revitalizing a DoD Unit

CBO based its estimates of the present discounted value of savings from decisions to retire rather than replace or revitalize DoD units (see Box 1 on page 20) on the same data that were used to compare the annual costs of DoD housing and housing in the private sector (see Figure 6 on page 18). But how are these annual cost estimates converted to estimates of the present discounted value of future savings?

Over the 57.5-year service life of a DoD unit, the savings from retiring rather than replacing a DoD unit have a present discounted value of approximately \$140,000. That total includes the present value of all capital costs that are avoided by not replacing the unit (\$120,000, using the same assumptions about the cost of construction and service life that were used to estimate the amortized cost of capital shown in Figure 6). The present value of the operations and maintenance costs and of Impact Aid payments that are avoided during the 57.5 years that the DoD unit would be in use are also included in this estimate; however, CBO subtracts the present value of the housing allowance payments that would be incurred during this period if the replacement unit was not built. The estimated present value of resource savings during the service life of the DoD unit--approximately \$90,000--is equal to these estimated federal savings of \$140,000 less the present value of out-of-pocket costs during the 57.5 years. The present values for operations and maintenance costs, Impact Aid, and out-of-pocket costs over the service life of the DoD unit are derived from the average annual costs (see Figure 6 on page 18).

If DoD decides to reduce the size of its inventory permanently by retiring rather than replacing a unit, the federal government will reap savings in two contexts: from not replacing the unit today and from not replacing the unit in the future. In that case, the savings extend beyond what would be the service life of the unit if it were to be replaced today. In effect, the federal government gains a stream of annual savings in all future years equal to the difference between the average annual allowance payments (\$7,500) and the average annual cost of a DoD unit (\$12,500, excluding the cost of land; see Figure 6). Using a 3 percent discount rate, this stream of future savings has a present value of \$170,000. The resource savings from this change in DoD's inventory policy (\$110,000) are equal to the federal savings less the present value of the out-of-pocket costs incurred in all future years.

If DoD decides to retire rather than revitalize a unit, the federal government would save approximately \$70,000 (in discounted dollars) over the 22.5-year service life of the revitalization. That amount includes the \$60,000 in revitalization costs that are avoided plus the present value of the savings in operations and maintenance costs and Impact Aid payments over the service life of the revitalization, less the present value of the additional allowance payments incurred during the same period. The resource savings from this decision are approximately \$40,000 over the service life of the revitalization (\$70,000 in federal savings less the present value of the out-of-pocket costs during the 22.5 years).

If the decision to retire rather than revitalize a unit involves a permanent reduction in DoD's housing stock, the federal government will avoid the cost of replacing the unit in the future as well as the cost of revitalizing it today. In that case, the present value of federal savings would be approximately \$150,000 (the present value of federal savings over the service life of the revitalization--\$70,000--plus the value today of permanently reducing the DoD inventory by retiring a unit in need of replacement 22.5 years from now). The resource savings in this instance are approximately \$100,000, which equals the estimated federal savings of \$150,000 less the present value of out-of-pocket costs in all future years.

The Discount Rate Assumption

Decisions to reduce DoD inventories result in positive discounted savings regardless of the discount rate that is applied (because the savings stream is positive in all years). But the

amount of those savings depends on the discount rate. CBO analyses typically assume discount rates ranging from zero percent to 4 percent, with 2 percent used as a midpoint estimate. DoD, however, applies somewhat higher rates. In accordance with the guidance in the Office of Management and Budget's Circular A-94, those rates range from 2.7 percent for projects with short service lives to 3.8 percent for projects (such as the construction of housing) that have service lives of 30 years or more. The calculations in this study use a 3 percent rate, which is more consistent with DoD practice than a 2 percent rate and better reflects the long-term nature of housing projects.

What effect would alternative discount rates have on the estimated savings from reducing DoD inventories? The present discounted value of decisions to reduce inventories decreases as the discount rate rises. For example, over the service life of the unit, the value of resource savings from retiring rather than replacing a DoD unit is \$98,000 if the discount rate is zero percent and \$90,000 if the rate is 4 percent. Changes in the discount rate have a similar, though more dramatic, effect on the value of resource savings from a DoD decision to reduce its inventory permanently by retiring rather than replacing a unit. Those savings are infinite if the discount rate is zero percent; they fall to \$135,000 if the discount rate is 2 percent and to \$100,000 if the discount rate is 4 percent. Annualized savings, however, follow a different pattern because the value of \$1 in perpetuity increases as the discount rate falls. With a discount rate of zero percent, the annualized savings from DoD's decision to reduce its inventory permanently would be \$1,700; with a discount rate of 2 percent, those savings would be \$2,700; and with a discount rate of 4 percent, they would be \$4,000.

The Impact of Price on Expenditures for Housing

As part of this study, the Congressional Budget Office performed a statistical analysis to examine--for individual paygrades--the relationship between the price of housing in military housing areas and the median real quantity of housing that military families purchase in those areas. The analysis used the ordinary least squares regression technique applied to data for 364 MHAs in the United States. As the measure of the price of housing in each MHA, CBO used the fair market rent of a two-bedroom apartment, as determined by the Department of Housing and Urban Development. (In cases in which more than one FMR applied to the region covered by an MHA, the analysis used a weighted average of the relevant FMRs, prepared by the staff of the Seventh Quadrennial Review of Military Compensation.) CBO determined the median real quantity of housing purchased by military families in a particular paygrade in each location, measured in two-bedroom equivalents, by dividing the median expenditure for the paygrade in each MHA by the FMR.

The analysis revealed that the median quantity of housing purchased by military personnel was significantly less in high-cost MHAs than in low-cost ones. This finding

held true for all of the paygrades examined (enlisted paygrades E3 through E9 and officer grades O1 through O7). For most paygrades, a 10 percent increase in the price of housing was associated with a 3 percent decrease in the median quantity of housing purchased and a 7 percent increase in the median expenditure. That outcome indicates that the current rates of the variable housing allowance, which are based on observed median expenditures, will fail to compensate service members fully for regional differences in the price of housing.

Economic theory suggests that the median real quantity of housing purchased in an MHA by individuals in a particular paygrade (Q) is a function of the price (FMR)--that is, $Q = \alpha + \beta \text{ FMR}$. Median expenditures for housing ($Q \times \text{FMR}$) thus equal $\alpha \text{ FMR} + \beta (\text{FMR}^2)$. In the results shown in Table D-1, median expenditure is the dependent variable, and FMR and FMR^2 are the explanatory variables. The price elasticity of demand, shown together with the coefficient estimates, is a measure of the percentage change in the quantity purchased (Q) resulting from a 1 percent change in price (FMR). Estimates of the price elasticity of demand at the mean were obtained from the regression coefficients using the formula $E = \beta \times \text{FMR}/Q$.

Table D-1.
Results of CBO's Regression Analysis of the Relationship Between the Price of Housing
in MHAs and the Median Real Quantity of Housing That Families Purchase

Paygrade	Estimate of α	Estimate of β	R-Squared	Price Elasticity of Demand
E3	1.1740	-.0004	.70	-.22
E4	1.3187	-.0005	.65	-.23
E5	1.5234	-.0006	.71	-.26
E6	1.7219	-.0007	.72	-.28
E7	1.8976	-.0008	.73	-.28
E8	2.1201	-.0010	.74	-.32
E9	2.3328	-.0012	.76	-.34
O1	1.5096	-.0005	.69	-.22
O2	1.7111	-.0007	.70	-.25
O3	2.0901	-.0009	.69	-.30
O4	2.5755	-.0012	.69	-.32
O5	2.9807	-.0015	.68	-.35
O6	3.2448	-.0017	.65	-.37
O7	3.5052	-.0019	.64	-.38

SOURCE: Congressional Budget Office.

NOTES: The equation estimated was $\text{MEDIAN EXPENDITURE} = \alpha \text{FMR} + \beta \text{FMR}^2$. All estimated coefficients are statistically significant at the 1 percent level, based on a t-test. Each regression was based on 364 observations.

MHA = military housing area; FMR = fair market rent, determined by the Department of Housing and Urban Development.

Estimating Allowances Under Option 4's Alternative System

One of the options examined in this study (Option 4) would set housing allowances so that the out-of-pocket cost for a standard-quality housing unit would be the same regardless of location.

CBO defined a "standard-quality unit" for each paygrade based on the type of housing typically obtained by military families in that category. For every paygrade, CBO determined the quality of housing obtained by the median military family in each military housing area by dividing median housing expenditures (obtained from Department of Defense survey data) by the Department of Housing and Urban Development's fair market rent for a two-bedroom unit. In effect, this calculation measures quality in terms of two-bedroom equivalent units: a unit that costs twice as much as the HUD fair market rent for a two-bedroom unit has a quality measure of 2. The standard-quality unit for each paygrade is a weighted average of these local medians, with weights based on the number of military families in each area (see Table E-1).

The following example shows how allowance levels under this alternative system would be determined for a particular paygrade and location. Consider an E4 in a location in which the HUD fair market rent for a two-bedroom unit is \$480 per month. The standard-quality unit for an E4 (from Table E-1) is equivalent to 1.1 two-bedroom units; thus, the cost of the standard-quality unit for this E4 is $\$480 \times 1.1$, or \$528. The HUD fair market rent for a two-bedroom unit in the median cost location for military personnel in the United States is \$510 per month. Under the alternative housing allowance system, there-

fore, the E4 would receive an allowance equal to the local cost of the standard unit less 22 percent of the cost of that unit in a median cost location: $\$480 \times 1.1 - (0.22 \times 1.1 \times \$510)$, or $\$528 - \$123 = \$405$. The out-of-pocket cost incurred by families of E4 personnel who purchase a standard-quality unit ($0.22 \times 1.1 \times \$510$) would be the same regardless of location.

Table E-1.
Standard-Quality Housing Units
by Paygrade Under the Alternative System
Proposed in Option 4
(In two-bedroom equivalents)

Personnel Paygrade	Standard- Quality Units
Enlisted	
E1	0.91
E2	0.96
E3	1.00
E4	1.11
E5	1.23
E6	1.38
E7	1.49
E8	1.60
E9	1.71
Officer	
W1	1.43
W2	1.59
W3	1.69
W4	1.76
O1	1.26
O2	1.40
O3	1.63
O4	1.91
O5	2.10
O6	2.18
O7	2.07

SOURCE: Congressional Budget Office.